Vol. 44, No. 1

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

SEASON[illegible]INGS

Breaking through the Resistant Crust

Photo courtesy
Monsanto Chemical Compa

In the man's hands is the equivalent in Krilium of pile of compost between man and boy. Krilium is not subject to bacterial attack, lasts much longer.

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Surely educational theory agrees the lad's interest must be pulled beyond himself so that the back and forth traffic set up can increasingly get through. Certainly educators agree enthusiasm must be focused on something bigger, better and beyond the lad's own petty ego. Certainly in mechanical drafting there is golden opportunity not only in a new class, a new subject, but in the fact the boy is linking brain and hands in a task that is the first step on a road that can lead to the self-transcending goals of engineering, scientific and other creative contribution . . . with good to the world, with honor, prestige and appreciation to the giver.

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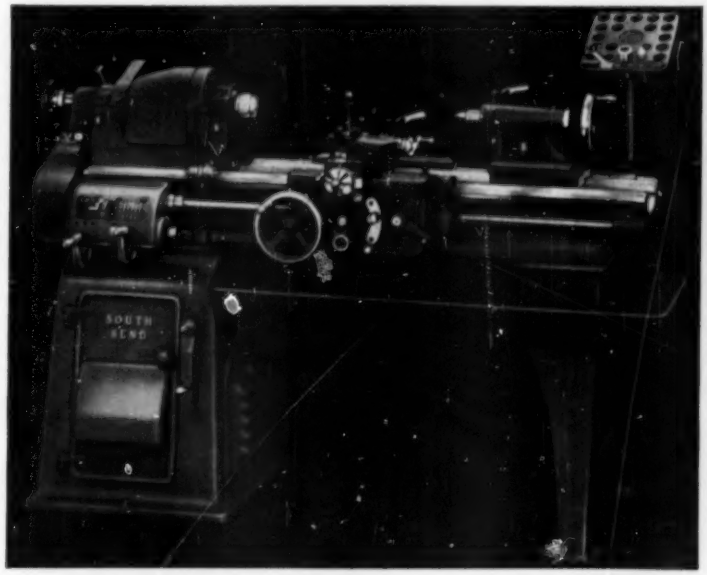

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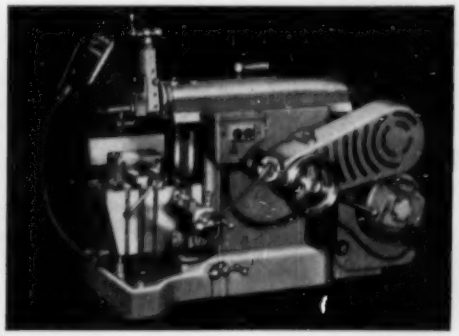

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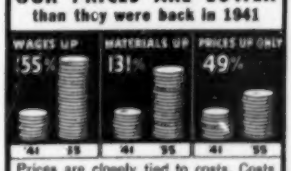

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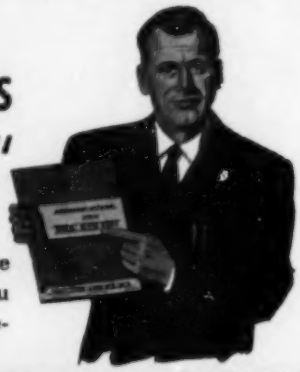

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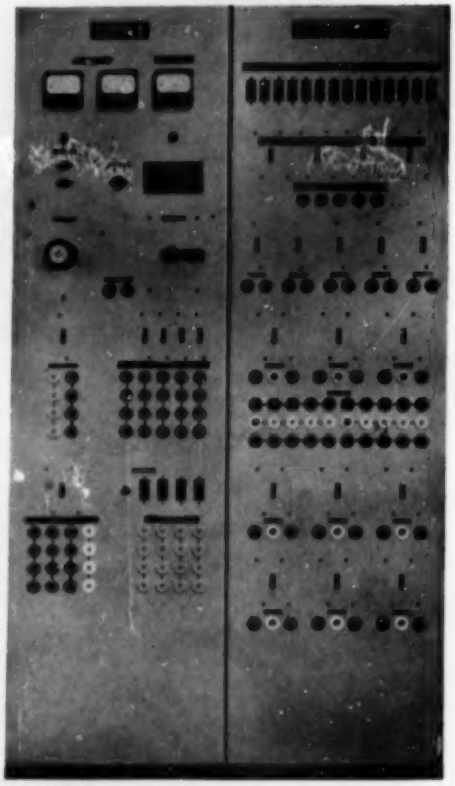

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JANUARY
1955

VOL. 44 NO. 1

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

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This Month's Cover

Leather craft at Glendale Union High School, Glendale, Ariz., includes adult education classes in the evening. The purse exhibited here was made by the student, Thelma Avis, shown in the picture.

The instructor of the class is Wayne Heffelfinger. The photograph was made by Morton Boss, and was submitted by Alvin H. Levin.

★ ★ ★ ★

JOIN THE MARCH OF DIMES

January 3-31

★ ★ ★ ★

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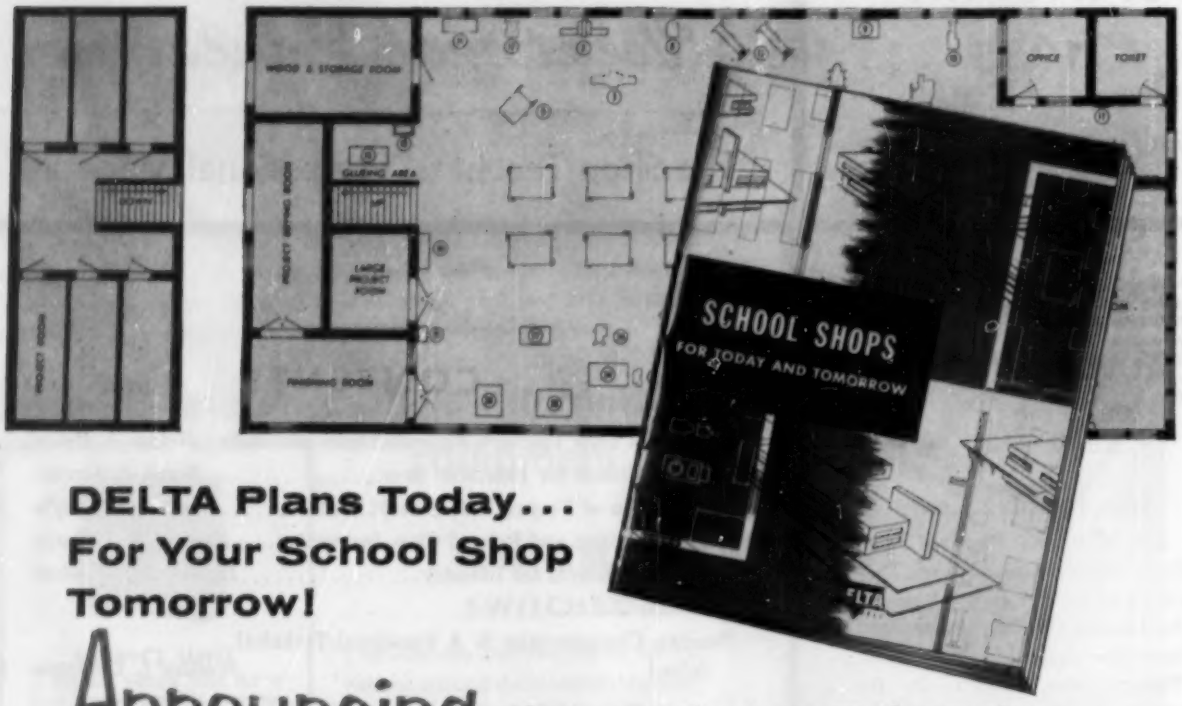

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Association News

INDUSTRIAL ARTS CONFERENCE

The 41st Annual Industrial Arts Conference of the Mississippi Valley was held at Chicago, Ill., on November 11, 12, and 13, 1954.

The general chairman, Verne C. Fryklund, opened the first session at 9:30 a.m., on Thursday.

The question to be discussed was "Effective, Selective, Recruitment of Young Men and Women for the Profession of Teaching, especially Industrial Arts." John Feirer, the chairman, was assisted by L. L. Gore and F. J. Schmidt.

The discussion brought out the following facts:

1. Recruitment of qualified teachers has generally declined from a total of 86,000 in 1950, to 55,000 in 1953.
2. The requests for industrial-arts teachers far outnumber the supply.
3. Encourage the best high school students to embrace this fine professional vocation.
4. Attract students by making the teacher preparing classes and shops so as to impress and attract candidates. Improve the curriculum and picture teaching as inviting as it really is. Help the student learn about the creative opportunities in teaching.
5. Obtain scholarships and let students, counselors know about them so they know what the industrial-arts field offers to them when they are planning their college courses.
6. Pick likely high school boys and create an interest in our profession by uniting them in active industrial-arts clubs.

At the afternoon session "Recent Research Studies Bearing on Industrial Arts and Vocational Education," were discussed.

O. A. Hankammer was the general chairman; M. Ray Karnes acted as the discussion chairman; and John A. Jarvis and H. H. London assisted him in presenting the problem.

The studies being reported were all made by graduate students at various teacher preparing institutions. Among the things pointed out were:

1. High school background of industrial arts is not essential for scholastic success nor graduation as an industrial-arts teacher.
2. The American Council on Education Psychological Examination and co-operative English test do not identify the student who will later graduate.
3. Technical high school graduates have a better high school background than their grades indicate.
4. Psychological tests in English and reading comprehension seem to measure the true abilities of the students better than the high school grades.
5. Students who achieve grade averages below 75 in high school, or ranked in the lowest quartile of their graduating class, are poor college risks.
6. A good high school background in science and mathematics seems to be essential for success in an industrial-arts teacher preparation program.

The general chairman of the Friday morning session was Verne C. Fryklund.

The chairman of the discussion topic was M. E. Franklin, and his assistants were Doyle Kemper and C. R. Kinison.

They presented the subject, "The *Crafts* Problem and Its Rightful Place — in Art or Industrial Arts."

This subject brought forth a very lively discussion. The consensus was that industrial-arts teachers should become very much interested in the program, because its objectives coincided in many phases with those of industrial arts and the teachers of industrial arts are in general better trained to teach the subject than the teachers in art and other subject areas.

The Friday afternoon session was conducted under the chairmanship of Verne C. Fryklund.

The discussion topic was "How Can We Best Promote and Develop Industrial Arts in the Elementary School?"

Discussion chairman N. B. Grinstead was assisted by E. W. Tischendorf and H. L. Oakley.

The three speakers presented a good picture of the problem as it confronts education today.

The consensus was that the industrial teacher must assist, explain, and supervise this subject presented in grades 1, 2, and 3.

1. The work for these three grades should be taught by elementary school teachers who have had special training in this type of industrial-arts work, and the work should be given in the regular classroom used by the pupils.
2. Grades 4, 5, and 6 should then be given by regular industrial-arts teachers in an activity or craft room.

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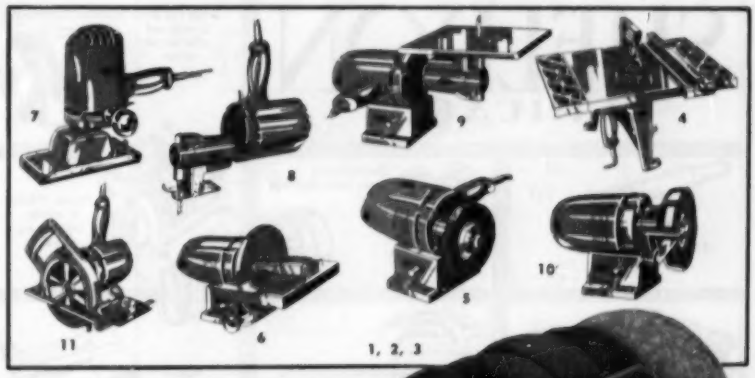

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ASSOCIATION NEWS

(Continued from previous page)

3. Equipment must be chosen so that it fits the needs and abilities of these young pupils.

The general chairman at the Saturday morning session was Verne C. Fryklund.

The panel discussed the problem of "Promotion of Industrial Arts at the State Level."

Panel chairman R. H. Larson presented the subject. He was assisted by P. S. Waldeck and R. A. Hardin.

Some of the speakers expressed fears that when the industrial-arts teachers and vocational teachers are associated in one organization, the industrial-arts teachers would not be helping to promote their own work. It would be better for them to associate with general education associations.

This presentation aroused considerable discussion and the final session had to be adjourned without arriving at any general conclusions.

The new members who were inducted are: Robert E. Smith, Dr. Wm. J. Micheels, Dr. Howard Odin Reed, Dr. Walter C. Robinson, Dr. Leon Bibb, Dr. Robert Kinker, and Tom Diamond.

The next meeting will be held November 10, 11, and 12, 1955, at Hotel LaSalle, Chicago, Ill.

KENTUCKY-TENNESSEE INDUSTRIAL ARTS TEACHER TRAINER CONFERENCE

The 6th annual fall meeting of the Kentucky Conference and the first meeting in which the Tennessee representatives participated, was held at Western State College, Bowling Green, Ky., October 15 and 16, 1954. The 1955 meeting will be at Murray State College, and the 1956 Conference will be held at Murfreesboro with Middle Tennessee State College host.

The present plan calls for alternate annual meetings in Kentucky and Tennessee and the Kentucky group has in addition a spring meeting in Louisville during the State Educational Association. We had 100 per cent attendance of the Kentucky Teacher Trainers at the 1954 meeting.

ANNUAL MU SIGMA PI DINNER

The Annual October dinner of Mu Sigma Pi, was held October 19, 1954. One of the highlights of the evening was an address by Gorton Riethmiler, administrative assistant, Highland Park public schools. After his opening remark, "No teacher can have 30 years of experience; all he can really have is one year experience repeated 30 times," Mr. Riethmiler continued with his impressions of thirty years in Highland Park.

President Don Zwickey introduced the following speakers for the evening: Neill Lottridge, Jack Zook, Lyle MacKellar, Jim Stark, Lee Litchfield, and Jim Linville.

DELAWARE STATE INDUSTRIAL ARTS ASSOCIATION

Officers of this organization for the year 1954–55 are: president — John W. Crowther, Mount Pleasant High School, Wilmington, Del.; vice-president — Harry W. Bock, Delaware City High School; secretary-treasurer — Clifton Jones, Wilmington High School.

AUTOMOTIVE SERVICE SCHOOLS CONFERENCE

The Educational Conference of the Automotive Service Schools was held at Wayne University on October 19, 1954, with the objective of integrating the educational program of these schools with the industrial education program offered by the various colleges and universities throughout the country. The impetus behind this conference was furnished by the National Association of Industrial Teacher Educators, who incidentally will receive a full report of the conference at the convention of the American Vocational Association in San Francisco in December. The membership of the conference represents a wide variety of service schools plus several key persons in the Wayne University program who have been associated with this problem on various levels.

At the luncheon, which was held in the University Room of the Student Center, Andrew Althouse, supervisor of vocational education for the Detroit schools, acted as chairman and toastmaster.

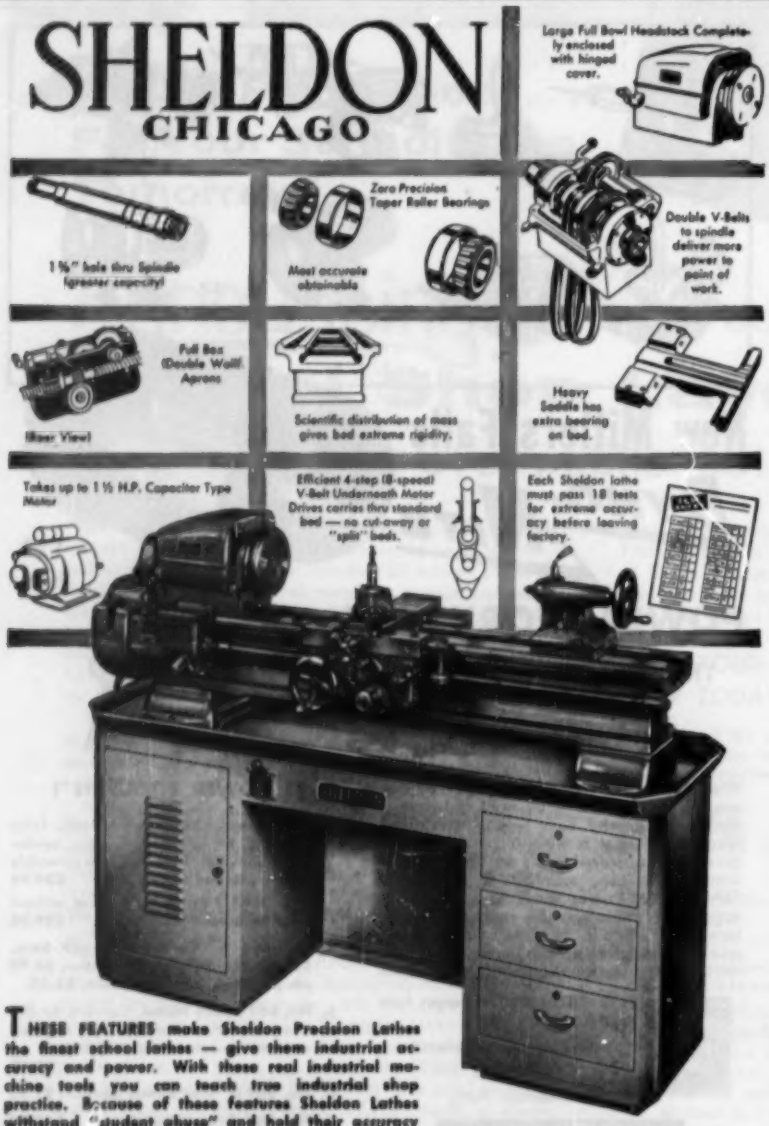
The conference made a great deal of progress in discussing the next steps in setting up some sort of accreditation program, by which the various colleges and universities would know the type and extent of a program that any industrial school was running. This whole plan has been sparkplugged by Frank Piovick, of Delco-Remy, who has worked tirelessly to bring this sort of a conference together.

The local arrangements at Wayne University were made by Douglas R. Sherman, co-ordinator of the Automotive Mechanics Program of the Department of Industrial Teacher Education, who is also a member of the conference. — *G. Harold Silvius.*

MINNESOTA INDUSTRIAL ARTS ASSOCIATION

The new officers for the two-year term, 1954–56, of the Minnesota Industrial Arts Association, are: president — Robert M. Worth-

(Continued on page 16A)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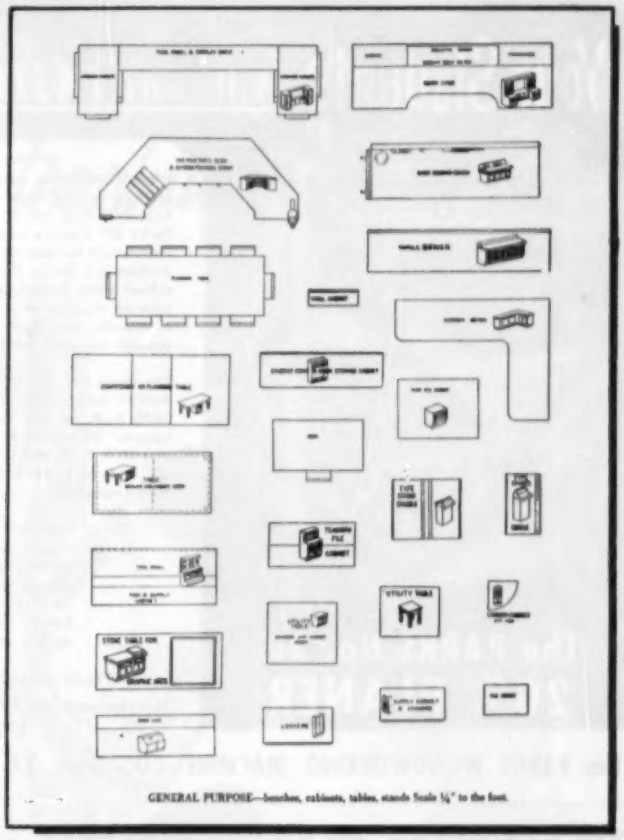

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SCHOOL SHOP PLANNING MANUAL

PREPARED under the experienced direction of the Education Department of Walker-Turner, this second edition of the SCHOOL SHOP PLANNING MANUAL provides the wealth of practical aids to successfully plan both layout and equipment for any size, any type of school shop

Complete to the smallest detail, it is one of the best books of its kind including well-organized discussions on the *essentials* of school shop planning, planning *principles* and *architectural* requirements. Besides many helpful photo-layouts of 3-dimensional scale models of actual custom-designed shops now in operation, it also contains a complete listing of suggested equipment for all types of shops including metalworking, automotive maintenance, ceramics, textile fabrication, graphic arts and woodworking.

A separate section of the book, printed on heavy stock for cut-out purposes, features a complete variety of templates. Over 700 of these template "tools" illustrate all types of shop equipment—machines, benches, cabinets, even student figures, etc. – in two scales: ¼ inch to the foot, and ½ inch to the foot.

Whether you plan to design and equip a new shop, or expand and improve your existing shop, the Walker-Turner SCHOOL SHOP PLANNING MANUAL belongs in your library. The price is $1.00 postpaid. Just clip out this advertisement, attach a $1.00 bill, and send to . . .

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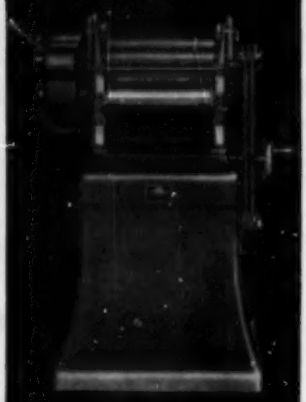

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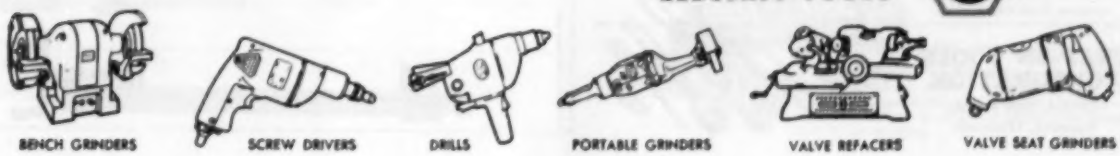

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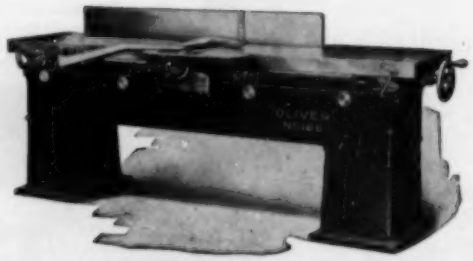

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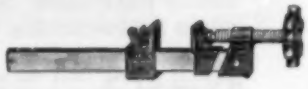

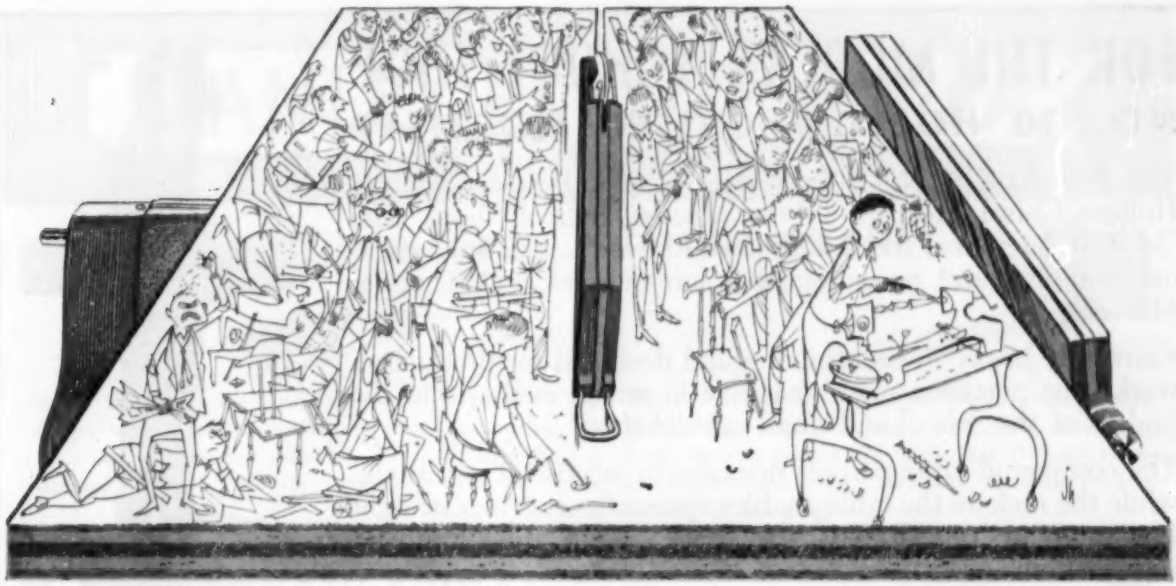

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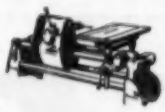

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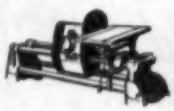

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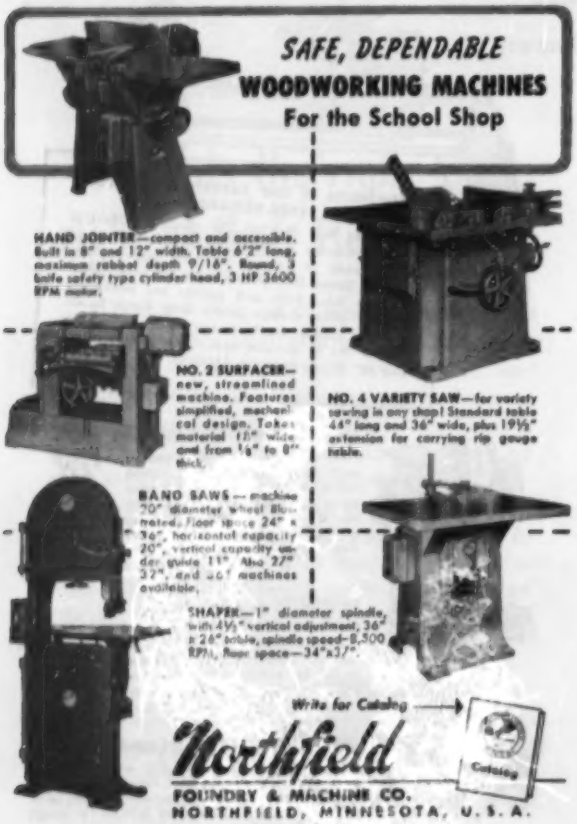

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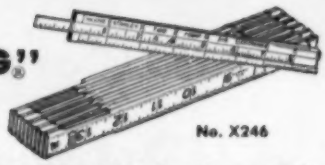

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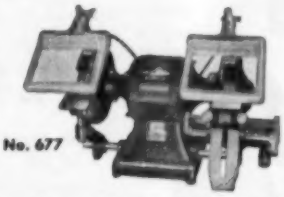

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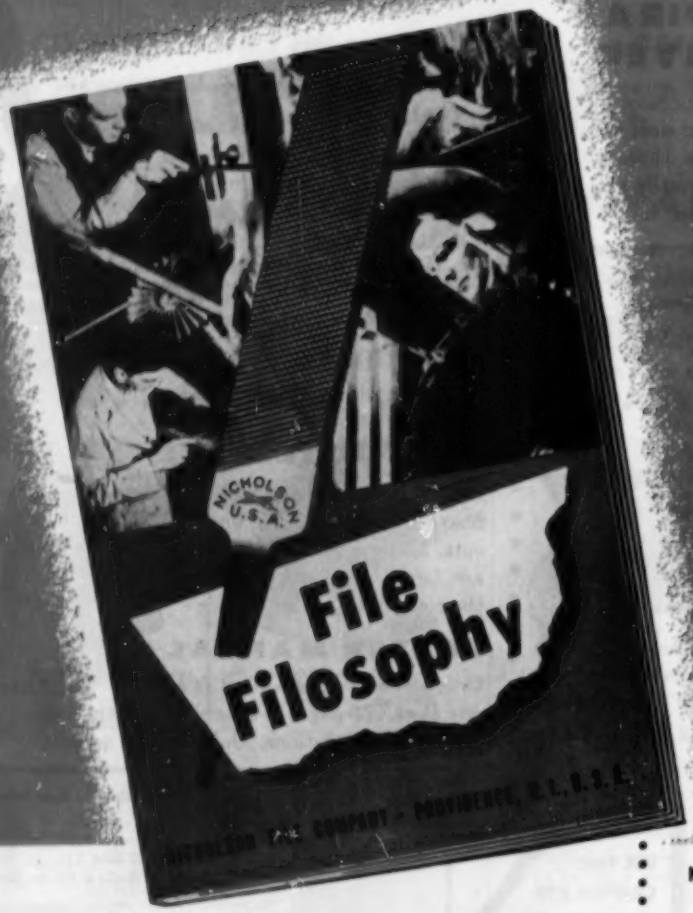

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Industrial Arts and Vocational Education
The Shop Teacher's Professional Magazine
JANUARY 1955

A Basic

Analysis of Shop Teacher's Responsibilities and Skills

NELSON A. HAUER

Professor and Head, Department of Industrial Education
Louisiana State University
Baton Rouge, La.

The responsibilities and skills required of a shop teacher are far more numerous and complex than the singular task generally referred to as teaching or the procedure of imparting information and instructing students in manual skills. For example, there is the skill of writing instruction sheets which is only indirectly related to the actual job of teaching. Also, there is the responsibility of counseling with a student, a task teachers are called upon to perform frequently.

Promoting good public relations is part of the teacher's job, too. While only vaguely related to classroom or shop teaching, good public relations are essential for the success of the total school program.

As a means for providing in-service teacher training, a series of conference-type meetings was held in which an analysis was made of instructional skills and responsibilities required of a trade and industrial teacher. The analysis consisted of seven blocks or subclassifications. Each item presented for description in the various blocks was supplemented with descriptive statements pertaining to information and skill about which a teacher should be familiar. The analysis is submitted along with an invitation for teachers to supplement it according to their individual experiences. It may be used by the shop instructor in two ways. First, it may be used as an inventory of one's personal qualifications, second, the various items may be used as a check list to indicate the extent of one's professional activity.

I. Managerial

Responsibilities
1. Records
Item Analysis
1. Kinds
   a) Attendance
      1) Daily
      2) Monthly
      3) Accumulated hours
   b) Progress charts
   c) Grades
   d) Accident reports
   e) Dropouts
   f) Placement records
   g) Permanent record cards
2. Keep records up to date.
3. Submit records promptly.

Responsibilities
2. Inventory
Item Analysis
1. Kinds:
   a) Equipment — tools and machines
   b) Supplies
   c) Books
2. Factors:
   a) Name of article or equipment
   b) Shop inventory number
   c) Specifications
   d) Cost
   e) Manufacturer
   f) Date purchased
3. New teacher should check inventory.
4. Check inventory twice yearly at least.

Responsibilities
3. Ordering supplies
Item Analysis
1. Base purchases on bids.
2. Allow petty cash for specialties and emergencies.
3. Anticipate needs based on probable enrollment, number hours of instruction.
4. Order according to specifications.
5. Keep records of receiving supplies.
6. Purchase quality merchandise when possible.

Responsibilities
4. Preparing budgets
Item Analysis
1. Determine amount of money available.
2. Anticipate needs according to past activities and future plans.
3. Budget items:
   a) Give proper instruction to students.
   b) Replacement fund
   c) New equipment, machines, tools
   d) Materials and supplies

Responsibilities
5. Shop maintenance
Item Analysis
1. Establish a program of preventive maintenance:
   a) Give proper instruction to students.
   b) Teach care and use of machines and tools
2. Inspect equipment regularly.
3. Use students for maintenance and repair when possible.

Responsibilities
6. Housekeeping
Item Analysis
1. Provide good storage facilities for:
   a) Tools
   b) Materials and supplies
   c) Projects
2. Cleanliness:
   a) Detail to regular duties.
   b) Provide storage for oily rags and scrap.
3. Paint:
   a) Keep things well painted.
4. Have a thorough cleaning regularly.

II. Supervision

Responsibilities
1. Supervising students
Item Analysis
1. Talk in terms of students.
2. Know the stage of progress of every student.
3. Know student's ability.
4. Watch total class activity.
5. Give assistance to students experiencing difficulty.
6. Promote desirable teacher-student relationships.

Responsibilities
2. Discipline
Item Analysis
1. Have a policy.
2. Make sure students know the policy.
3. Enforce the policy.
4. Consider each case on a clinical basis.
   a) Try to determine reason for discipline.
5. Keep students busy and learning.

Responsibilities
3. Guidance and counseling
Item Analysis
1. *Purpose:*
   a) To help student help himself
2. *Procedure:*
   a) Have a private place for counseling.
   b) Create an atmosphere favorable for talking.
   c) Listen.
   d) Don't give advice.
   e) Give facts and let student decide.

III. Preparation of Instruction

Responsibilities
1. Course of study
Item Analysis
1. Base on trade or occupational analysis.
2. State objectives including:
   a) Manual skill
   b) Information
   c) Work habits
   d) Attitudes
   e) Job planning ability
3. Consider grade level, time, and number of students.

Responsibilities
2. Instruction sheets
Item Analysis
1. Kinds:
   a) Information
   b) Assignment
   c) Operation
   d) Job
2. Characteristics of a good sheet:
   a) Clarity
   b) Illustrative
   c) Interesting
   d) Format

Responsibilities
3. Planning
   1) Preplanning
   2) Daily plan
   3) Weekly plan
   4) Semester plans
   5) Postplanning
   6) Lesson plans
Item Analysis
1. Purpose:
   a) To orientate to one's job
2. Lesson plans and daily records
3. Things to be accomplished
4. Factors to consider:
   a) Student progress
   b) Shop arrangement and care
   c) Personal achievement
5. Plans for new term
6. Steps in teaching a lesson:
   a) Preparation
      1) Teacher
      2) Student
   b) Presentation
      1) Method
      2) Content
   c) Application
      1) Student's job or assignment
   d) Tests

Responsibilities
4. Training aids
Item Analysis
1. Kinds
   a) Films
   b) Models
   c) Charts
2. Introduce and summarize films.
3. Make aid that will justify time involved and learning.
4. Color is more effective than black and white.

IV. Instructional

Responsibilities
1. Lecturing
Item Analysis
1. Have thorough knowledge of subject.
2. Present points orderly and concisely.
3. Gauge talk to level of group.
4. Time length of lesson.
5. Control voice.
6. Emphasize important points.
7. Summarize each lesson.

Responsibilities
2. Demonstrating
Item Analysis
1. Be sure you can do the job.
2. Prepare equipment and facilities.
3. Prepare class for demonstration lesson.
4. Present demonstration in instructional manner.
5. Check for comprehension.

Responsibilities
3. *a)* Individual instruction
Item Analysis
Uses:
1. To recognize individual difference.
2. To permit student to proceed at normal rate of learning.
3. For remedial instruction.

Responsibilities
3. *b)* Group instruction
Item Analysis
Uses:
1. When lesson is of group interest
2. As a timesaving device in teaching

Responsibilities
4. Assignment lesson
Item Analysis
1. Prepare the student for the assignment (motivate-create interest).
2. Emphasize the points in particular students should observe.
3. Make certain students understand what and how to do the assignment.
4. Be specific in assigning the lesson.

Responsibilities
5. Evaluation
Item Analysis
1. Purpose of evaluation:
   a) To measure student progress and achievement
   b) To check upon methods of teaching
   c) To enable student to evaluate himself
2. Kinds of tests:
   a) Essay
   b) True and false
   c) Completion
   d) Multiple choice
   e) Matching
   f) Performance

V. Extracurricular Activities

Responsibilities
1. Attending faculty meetings
Item Analysis
1. Purpose:
   a) To bring faculty closer together
   b) To develop school unity
   c) For administrative purposes
2. Be regular in attendance.
3. Try to participate in the discussions or activities.

Responsibilities
2. Member of school committees
Item Analysis
1. Purpose:
   a) To enrich the school program
   b) To divide the work load
   c) To provide an opportunity for teachers to participate in administrative functions
   d) A means for developing leadership traits
   e) A testing grounds for future administrators
2. *Types of committees:*
   a) Building and grounds
   b) Fire and safety
   c) Finance
   d) Cafeteria
   e) Graduation
   f) Exhibits
   g) Publicity
   h) Recreation
   i) Curriculum improvement
   j) School policy
   k) Textbook
   l) Etc.

Responsibilities
3. Sponsoring student organizations
Item Analysis
1. Types:
   a) Student council
   b) Alumni
   c) Club activities
   d) Student government
2. Purpose:
   a) To enrich student learning
   b) To provide leadership opportunities for students
   c) To develop school spirit

Responsibilities
4. Attending professional meetings
Item Analysis
1. Purpose:
   a) For teacher improvement and development
   b) To develop professional unity
2. Kinds:
   a) Staff meetings
   b) Local, state, and national
   c) Meetings for professional improvement

Responsibilities
5. Performing clerical work
Item Analysis
1. Kinds:
   a) Record keeping
   b) Report writing
   c) Letter writing

d) Filing records
Responsibilities
6. Placement and follow-up
Item Analysis
1. Determine place of employment.
2. Locate job opportunities.
3. Be familiar with labor laws and regulations.
4. Maintaining contact with student placed on jobs.
5. Promote good employer relationship.
Responsibilities
7. Unscheduled work for instructor
Item Analysis
1. Emergency maintenance and repair work for school.
2. Live jobs (accommodation work for students and faculty)

VI. Public Relations

Responsibilities
Item Analysis
1. Purpose:
   a) To build up community good will
   b) To inform public about program
2. Means:
   a) Join civic clubs
   b) Personal contact with public
   c) Speak to civic groups
   d) Exhibits
   e) Open house program
   f) Hobby shows
   g) Radio and TV programs
   h) Newspaper articles
   i) Business and industry and educational programs

VII. Research

Responsibilities
Item Analysis
1. Purpose:
   a) To improve methods of teaching
   b) To advance learning
   c) To discover new principles, practices, and procedures
2. Kinds of research:
   a) Pure
   b) Applied
3. Possible areas:
   a) Methods of teaching
   b) Psychology of learning
   c) Subject matter content
   d) Historical
   e) Evaluation

How to Understand the

General Method for Industrial Arts

FRANK L. STEEVES
Director of Student Teaching
University of North Dakota
Grand Forks, N. Dak.

Regardless of the subject-matter field, some problems in teaching are common to all teachers. So long as secondary school teachers teach pupils, the problems faced in teaching those pupils remain constant despite the differences which may inhere in different subjects. Pupils do not change so radically as they move from academic classroom to laboratory to shop that completely different methods are called for in presenting different subjects to those pupils.

Only two logical approaches to the problem of method are possible.

First, the method may be derived from analysis of the subject and be pertinent only in the teaching of that subject. In this case it is a special method and always is associated with some particular subject. An example might be the use of calisthenics as a method of attaining certain objectives in physical education. No use for this method can be found in any other subject-matter field because the objectives of no other field are met by this activity.

Or, the method may be derived from analysis of the pupil and the environment within which the school and pupil exist. In this case the principles derived from analysis of these factors constitute the bases of a general method. To the extent that the analysis is accurate the general method is valid.

This, of course, is a description of extremes in viewpoint. Many methods are neither derived from the subject, nor do they result from a study of the pupil and his environment. For example, such items as motion pictures, maps, charts, workbooks, discussion, and experiment may be used by any teacher. However, all such methods and all specific methods must be used in accordance with the principles of a valid general approach to the problems of teaching. Otherwise, teaching can become a frantic effort to attain technical competence in order to do the wrong thing as expediently as possible. It is obviously ridiculous for a teacher to learn many methods of presenting his subject and then to use these methods in ways which conflict with the principles of educational psychology or with the demands of the environment, natural, technological, and social, in which the pupil lives and will live.[1]

[1]For further development of these points see: Roy O. Billett, *Fundamentals of Secondary-School Teaching*. (Boston, Mass.: Houghton Mifflin Company, 1940, Chapter II, "Implications of Democracy For Secondary Education," Chapter V, "Learned Behavior and the Learning Process," and Chapter XIII, "Current Thought and Practice in the Field of Secondary-School Practical-Arts and Business Education."

It is important for teachers in the industrial arts to avoid the point of view that validity for industrial-arts methods may be derived only from analysis of the subject matter in industrial arts. To accept this point of view is to place very narrow restrictions on the activities which may be undertaken in any particular industrial-arts course. This viewpoint is blind to the existence of educational aims larger than those of a single subject. It is an educational dead end in some vogue at present among subject-matter specialists unable to see the large picture of education because of the little splash of color contributed by their own subject.

How to Judge Course Activities

This is just another way of saying that the good industrial-arts teacher must be both a good artisan and a good student of the total educational picture. Otherwise, he declines to the status of technician and joins the ranks of those spokesmen for certain outmoded academic subjects who, unable to justify their offerings in terms of present-day pupils and present-day life, turn back to their subjects for vindication of their colorless curricula and faded methods.

Perhaps it would be well to state several of the basic principles by which activities in *all* courses may be judged. These are principles of general method and are as applicable in the industrial arts as in foreign languages. *All* teachers should be aware of these principles. Planned activity in all courses should measure up to the implications of these

principles. The extent that they fail to do so is the extent of failure in good teaching.

First,[2] all activities should stimulate thought. Every activity should present a challenge to the pupil and require him to solve one or more problems as he works on the activity. Second, every activity should be economical of pupils' time and energy. Busy work should be avoided. Third, full use should be made of community resources. Classroom activity should be related to the pupil's out-of-school activities, his extracurricular activities, his other courses, and his life aims. Fourth, individual differences among pupils should be provided for by allowing some choice in required work, by allowing optional work, and by encouraging pupils' suggestions.

This is merely a partial list of the principles which are accepted generally and by which the activities in any classroom can be judged.

The problem of the good industrial-arts teacher is the same as that of the good teacher in any subject, namely, to apply such principles of general method to the specific course and to plan the activities of that course so that they will come up to the mark established by the accepted criteria.

This article would not be complete without a description of one industrial-arts course where these principles are accepted and applied.[3] The course, incidentally, is but one part of a total planned program practiced throughout the industrial-arts offerings of the school. All courses, so far as possible, adhere to the same types of activity.

First to note is the basic philosophy of the total program within which the course operates. The entire program is based on the assumption that every pupil in grades seven through nine needs practical-arts experiences for better and happier living. The responsibilities of home ownership, the need for better living through noncommercial recreation and hobbies, and the simple fact that intelligent buying demands some knowledge of industrial methods and materials seem to make the assumption a safe basis for action.

The class meets daily for a full year. After the first eight weeks two days per week are devoted to a core or required activity in which the entire class participates. Three days per week are occupied with individual projects. All such projects are entirely optional, undertaken by the pupil because he wants to do the work. Each results in a tangible, worth-while product which belongs to the pupil.

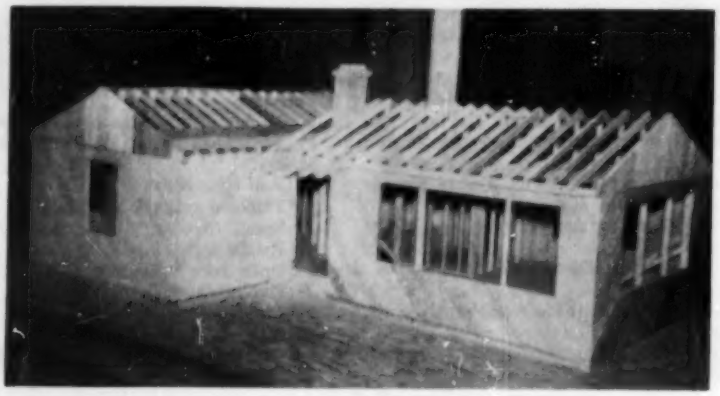

Fig. 1. The house model

The first eight weeks are devoted to required project exercises. Such project exercises are individual, required, and result in a worth-while product which is the pupil's property. They differ from the true project only in that they are required whereas the true project is always optional.

From about the sixth to the ninth week pupils who show initiative in completing required work, proficiency in handling tools and equipment, and understanding of the concepts and skills developed by the project exercises are allowed to undertake projects of their own. Eventually all pupils are allowed to work on individual projects.

As noted, after this preliminary period of approximately eight weeks devoted to project exercises, all pupils spend three periods per week on individual projects and the remaining two periods on a required, group activity. For example, eight weeks are employed on problems in patternmaking. At the time of this writing, the required group activity for the previous eight weeks had been the house model illustrated in Figure 1, part of a unit in carpentry. It is built to the scale of 1½ inches equals 1 foot. Much of the detail achieved by these ninth-grade pupils shows in the photograph.

The criteria for selecting core activities are simple. The work must be inherently interesting to the class. It must allow for the development of skills normally within the area of the course. It must indicate reasonably the possibility of pupils attaining indirect and incidental learning products of lasting value.

The house model easily meets these requirements. Pupils appear to recognize a real challenge in this work. They want to spend time and extra time on the required work. Doing this work is a real test of skill in woodworking, and carpentry. And the understandings and concepts gained during the construction of this model may well be of extreme value to future homeowners.

To those who would question the validity of including such an activity in the ninth grade, another generally accepted principle of general method may be cited. All activities should be based upon the experiences, abilities, and interests of the pupils taught. Otherwise, pupils would not be able to do the work. These pupils are doing the work. They are doing it because the work is based on their experiences, abilities, and interests. Therefore, it meets their present needs and should be given at this particular stage of their development.

The success of this type of activity is a direct challenge to teachers who remain content if twelfth-grade pupils show reasonable proficiency in building square boxes. These teachers probably wonder why interest, attention, and motivation remain problems in teaching.

The instructor in the course described here finds his pupils are all working and, hence, are interested, they pay attention, and they are motivated.

Not pictured are the wide variety of individual projects definitely related to the extracurricular and out-of-school activities of pupils. Sports equipment, toys, and furniture are among the types of projects undertaken. These tasks are not imposed on pupils. Needless to say, the problem of providing for individual differences was solved when pupils were sensibly allowed to relate their optional work to out-of-school and extracurricular interests.

Also not shown are numerous items of like nature related to other courses in the curriculum. These included several lockers repaired for the physical education department and instrument stands reclaimed for music classes. All such projects are entirely optional with pupils interested in the work.

The major thesis of this article has been that best teaching is done by teachers who approach their problems through the medium of a sound general

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[2]The foregoing is adapted from items appearing on *A Score Card for Evaluating a Teacher's Objective and Corresponding Assignment*, Roy O. Billett, Boston University School of Education, Boston, Mass.

[3]The activities described herein are those of the ninth-grade woodworking course, Central Junior High School, St. Cloud, Minn. Malcolm Doane is the instructor; Arthur Johnson, department head.

method. Industrial-arts teachers, particularly, should avoid the delusion that technical competence in the methods and materials of their subject will insure sound teaching within a sound program. The future of the industrial arts will be assured considerably if presented by teachers who are sound in educational theory as well as in craftsmanship.

The organization of one course based on valid general principles has been described in illustration of these points.

In closing, it should be noted carefully that nothing in this viewpoint denies the absolute necessity for a good teacher to know his subject and the special methods and materials in his subject. Best teaching is obtained when the instructor knows his pupils and knows why he is teaching those pupils a particular set of organized concepts and skills, but no teaching is possible by an instructor who does not know the concepts and skills. The implication of general method to a particular subject is not to discredit the methods inherent in that subject but to insure that the methods of that subject will be used in a manner consistent with the needs of children in a society which is somewhat larger than any given body of organized subject matter.

Organization of Project Reference Materials

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Emphasis on planning as an important function of industrial arts focuses attention on the need for a place to carry on this activity. Experience seems to indicate that better results are obtained from planning, and that it is easier to encourage students to plan, when some definite area is set aside and properly equipped and organized for this work.[1]

A pupil asks, "Where can I find a plan for a modern lamp?" How do you answer this question? Is your planning center so organized that it is possible to locate this plan with comparative ease? If you have a photographic memory you may be able to choose a book or two, or perhaps a magazine from the planning center library or even your own personal library. Perhaps you have a folder on lamps or modern furniture that may aid this pupil. Or do you tell your pupils to look through the books or perhaps sort through *Industrial Arts and Vocational Education* magazines?

Industrial-arts teachers do not need to know all the answers to all pupil questions, but we should endeavor to know some sources of the desired information. Pin-pointing an answer will save much time, both yours and the pupils'. It is quite easy to kill the pupil's interest in this lamp, or any project by referring him to the *pile* of books and magazines. It is with this pin-pointing objective in mind that the following system is suggested.

[1]Wilber, Gordon O., *Industrial Arts in General Education* (Scranton Pa.: International Textbook Co., 1948), p. 181.

In general, source materials can be classified into three main groups: books, magazines, and miscellaneous ideas. In a general shop or a general unit shop, books in each subject area can be organized and placed in one section of the bookcase or shelf. Painting a diagonal stripe, approximately 1 in. wide, on the edge bindings of the books will aid in keeping them orderly. The diagonal stripe should be so arranged to permit future books to be added to the collection. A different colored stripe is suggested for each subject area and can likely correspond to the tool and machine colors used for that area. Each book is now numbered, within its area, the number being placed on the previously painted stripe in a color that is legible. As previously mentioned, the stripe is for easy checking; the number will be used for reference. Each project of a similar nature, as table lamps, end tables, etc., will be listed on 3 by 5-in. index cards.[2] Each project in the books is then listed on the cards, referring to the color of the stripe or area, number of the book and page containing the project. For example, a modern

[2]*Ibid.*, pp. 190-192.

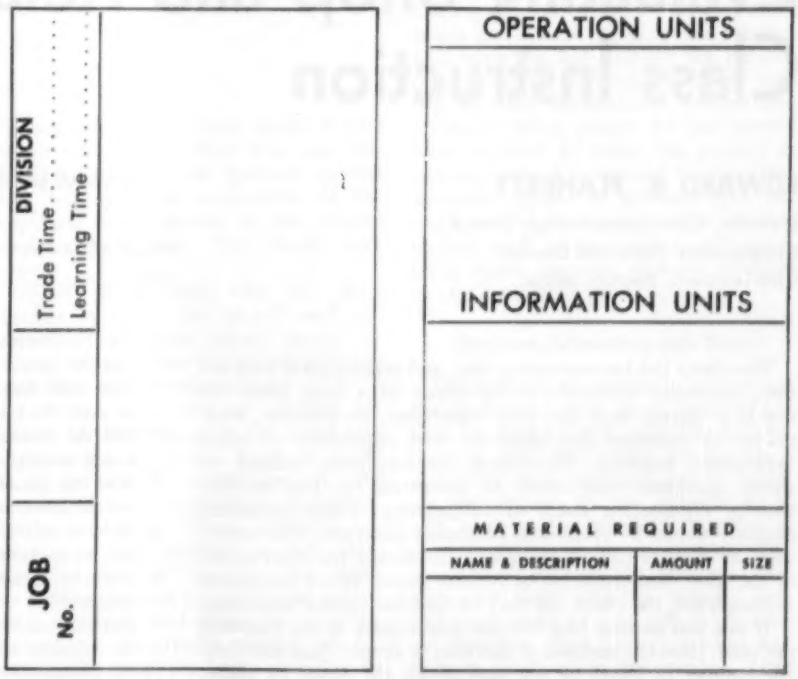

Fig. 1. Front and reverse side of 5 x 8-in. card

lamp found on page 37 of a book with a green stripe numbered 6, would be listed as lamp, modern G6-37. Other modern lamps would follow this listing giving the pupil a wide choice. Some instructors may prefer to list the area of the book rather than the stripe color. If the lamp were to be made of wood, the above reference would read W6-37 instead of G6-37. By this numbering of the books, it makes it easier and saves considerable room on the cards by not having to write or type the book title, author, etc. After all the books in one area have been completed, the cards are placed in alphabetical order. To keep them in order, any system similar to those used in school and public libraries may be used. Naturally, this seems like an endless task, but if tackled, one area at a time by yourself or perhaps with the aid of the class or office pupil in charge of filing shop materials, etc., it can be accomplished and will add to shop efficiency, saving everyone time and patience.

Magazines may be handled in somewhat the same manner. Many instructors prefer to bind each year's magazines and just keep current issues loose. This method protects the magazines and makes housekeeping a little easier. These magazines are then marked and indexed in the same manner as the books or by abbreviations for titles as IAVE 1954 June 248 would stand for the June 1954 issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine, project listed on page 248. A special section may be necessary for pamphlets, borrowed books, etc. Full indexing should be used in this case. Some instructors prefer to tear out the projects after a year or so and these will be handled in the next section. The exact length of time magazines are kept demands upon the shop facilities, etc.

Miscellaneous ideas may be sketches, newspaper clippings, or articles cut from magazines to be discarded. Most instructors keep this type material in folders sometimes under general classifications as wood, metal, ceramics, etc., or sometimes under specific headings as modern lamps, end tables, and ash trays. However, continued pupil use results in lost, torn, or thrown out plans, besides the difficulty of indexing such a system. Projects of reasonable size should be pasted on 5 by 8-in. cards. See Figure 1, which shows front and reverse side of the card and contains information that can be mounted directly from the magazine article or filled in at a later date. Bollinger[3] suggests the use of these cards for occupational analysis of vocational subjects. With modifications, this system can be adopted for our use in industrial arts. Oversize plans and plans on both sides of sheets can be organized in folders, and used with special care. Plastic covers are sometimes used but are expensive if used extensively. The cards for pasting the projects may be of various colors corresponding to the color of the area as in the case of the books. This will aid in quick filing. These cards are numbered and indexed. If colored cards are not used it will be necessary to prefix the card number with the initial letter of the area to differentiate between wood, metal, etc., projects when looking through the index. A metal lamp would be listed as Ml, or Gl if green cards were used for this area.

The 5 by 8-in. cards and the 3 by 5-in. cards may be filed in standard file cabinets which may be built into the planning center.

By the organization of source materials in this or similar manners, we can teach not only good housekeeping, care of equipment, but organization that makes possible research in the planning process providing the exploratory experience that our planning centers were designed to accomplish.

[3]Bollinger, Elroy W., and Weaver, Gilbert G., *Occupational Instruction* (New York: Pitman Publishing Corp., 1945), pp. 35–43.

An Aid to

Evaluating Shop and Related Class Instruction

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The check list for evaluating shop and related class instruction, presented herewith, is the result of a long study of marking factors that the shop supervisor, or director, may utilize to estimate the efficiency and capability of shop instructors' teaching. The check list has been reduced to thirty questions that could be answered by *Yes* or *No*, thereby eliminating much of subjectivity. These questions embrace points of vocational education concepts. The supervisor or director can fill this check list during his observation of the shop demonstration or related lesson. When the lesson is completed, the check list may be filed for further reference.

If one can assume that the maximum mark is one hundred per cent, then the method of marking is simple. Just multiply the number of *Yeses* by ten, and divide the result by three. The result could be considered a percentage mark.

A Check List for Evaluating Shop and Related Class Instruction

*Name of Instructor*_____ *Grade Taught*_____
*Date*_____ *Title of Lesson*_____

	Yes	*No*
1. Was the instructor master of his subject matter?	____	____
2. Did the instructor have all the necessary equipment and instructional material all in readiness to start the instruction on time?	____	____
3. Did the instructor prepare a lesson plan of the lesson taught?	____	____
4. Was the lesson analyzed and organized into its instructional factors?	____	____
5. Did the instructor utilize some current teaching skill or technique to put over the lesson?	____	____
6. Did the instructor talk to the level of the trainees?	____	____
7. Did the instructor attempt to find the level of the trainees by setting questions that refer to the background and previous experiences of the group?	____	____

	Yes	No
8. Did the instructor encourage the trainees to work to their best abilities?	____	____
9. Did the instructor use training aids?	____	____
10. Did the training aid used fit the purpose for which it was intended?	____	____
11. Did the instructor know how to instruct with this training aid?	____	____
12. Did the instructor stimulate questions from the trainees?	____	____
13. Did the instructor utilize the development method questioning the trainees?	____	____
14. Did the instructor refrain from asking leading questions?	____	____
15. Did the instructor employ means to minimize class interruptions or distractions?	____	____
16. Did the instructor stick to the subject of the lesson?	____	____
17. Did the instructor encourage trainees' participation and discussions?	____	____
18. Was the instructor neat, adequately groomed, and did he wear clothes in a conventional manner?	____	____
19. Did the instructor show good posture and was he standing in front of the group?	____	____
20. Was the instructor devoid of offending and erratic mannerisms?	____	____
21. Did the instructor show enthusiasm, interest, and constantly aim to focus the attention-getting factor?	____	____
22. Did the instructor use a pleasing and controlled modulated voice?	____	____
23. Did the trainees show understanding of the subject?	____	____
24. Did the instructor assign to the trainees the necessary preparation for the next week's lesson?	____	____
25. Did the instructor state clearly the objectives of the lesson taught?	____	____
26. Was the instructor instructing to his maximum efficiency?	____	____
27. Were efforts made to maintain a comfortable temperature during the instructions?	____	____
28. Was the illumination adequate to carry on with the instruction?	____	____
29. Did the instructor place the trainees to the best advantage?	____	____
30. On the whole did you consider the lesson you observed to be a good one?	____	____

A Serious Problem — That of

Preparing Students for Industry

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Young Keller from West Virginia was only 16 when he was brought back from Korea. To join the army he forged his parent's signature and swore that he was 17. He weighed 180 pounds on enlistment and had lost 30 pounds. When asked if he intended to go back to school, he said, "Not if I can help it."

Obviously young Keller didn't like school. There is something the matter with schools when boys get this idea. The fault is not all with the boy.

The industrial curriculum should provide for the needs of every school student. Today, the largest percentage of high school graduates who show up at employment offices have had no contact with school shops and yet they want jobs in factories. Under "position applied for" they write "will take anything" and under "wage expected" they write "going rate," or leave the space blank. One company has a space on its application blank captioned, "Position applied for" and another space for "Second choice." In these spaces it gets many odd replies. Not long ago one applicant wrote under position applied for, "sitting." The seriousness of the applicant was attested by the second choice which was, "can stand part time."

What contribution can the shop teacher make to the growth and development of these young people to prepare them better for entering industry? Here are five suggestions:

1. Every shop teacher should acquaint his students with the value and appreciation of time. Most students have very little conception of the amount of time necessary to start and finish a project. When students are learning a new process or skill they must be given all the time they need for getting the idea correctly and applying it properly. But often this learning process can be greatly speeded up by putting the neophyte under pressure to complete the process in a minimum set time. Each student in the shop differs from his neighbor in the speed with which he can acquire and assimilate knowledge and skill. That must be taken into consideration by the teacher. But when he has finished his project, does he know how long it should take him to make another and another and another? What should be the normal time required to make the project or drawing after his learning is complete? Accuracy should be stressed first, but don't let the student go on to another project until he has been taught something about the time element involved in the completed project.

Students Estimating Job Time

When the next project is started ask the student to make an estimate of the time he thinks it will take him to complete it. Help him break his procedure down into time elements and to schedule his progress on the calendar so he will have a day to day objective in the completion of his assignment. This practice of making the students conscious of time must be stressed over and over again or you will be turning out dawdlers. Dawdling is a habit and a grave handicap to any worker. Time is an element in our lives that we dare

not disregard. The shop teacher has a wonderful opportunity to teach time appreciation. By teaching the young men and women in the shops to follow a time schedule, not too rigid but still a framework within which all activity takes place, you will instill a habit that will be of immeasurable value to them in industry and in other enterprises as well.

2. A second suggestion for a contribution which the shop teacher can make to the growth and development of youth to equip it better to enter industry is that of motion or movement consciousness. There is too much trial and error in the school shop and the industrial shops. The shop teacher should learn conservation of movement and analyze every project so that the student will not make wasteful and useless movements. Acquaint the students with the principles of motion economy. Have them keep a record of the motions necessary to perform a task assigned and, later, show them which movements can be eliminated. By eliminating wasted movements the task can be performed quicker and easier. Why not analyze your own shop to see if the tool crib can be closer to all the boys, or the material source closer to the benches? Can the projects be analyzed for movements and the best way set up before the student starts? Can doors open easier, etc., etc.? Have students always on the alert to conserve energy through motion and movement mindedness.

Safety Mindedness

3. A third suggestion for equipping youth better to enter industry is that of safety mindedness. Shop teachers will declare that they are already teaching safety. There is much literature available from numerous sources on school shop safety. Our schools and shop teachers still have not placed the emphasis on safety that it should have. Not long ago the writer visited a school shop where the instructor had painted the machines, using one of the schemes of color dynamics, but there were no guards over the open belts. Some of the boys were wearing sweatshirts with long sleeves, others had ties hanging loosely, and there was no effort made to have the boys dress properly for the work to be done. When the instructor was asked if some of the things observed were safe, he stated that he had not had an accident in the shop for several years. This is not the point in teaching safety to young boys. The point is to establish a set of safe work habits so that the students will not acquire the careless habits of accident prone individuals. Psychologists know that 85 per cent of all our accidents are caused by human failures.

The teaching of safety involves more than guarding machines. It involves housekeeping, attitude formation, and other habits. It means teaching the students how to handle themselves in mechanical pursuits of the job. For instance, some companies have a measure of ability to identify hazards which they administer to all new workers before they start on the job. Do you know that a surprisingly large number of these people do not know how to lift, or even how to get up from a chair, or pick up a pencil the easy way?

Of course, we get by with taking chances when we are young, but we don't get by with all those chances when we have lost the alertness, agility, and quickness of our senses which we once had. Therefore, teachers should inculcate those habits of self-awareness known as safety mindedness in the minds of students with all the energy possible.

4. Another contribution to the development of youth in which the shop teacher has unusual advantage over the academic teacher is that of helping youth to maturity and an understanding of what is known as human relations in industry and business. In industry, people are only boys and girls grown tall. They have not matured. They do not understand themselves nor the other fellow. They gripe and claim the foreman and supervisors show favoritism in the assignment of work. They pass around gossip about others. They form cliques. They are food fussers in the cafeteria, and so on and on. They act like children. Even if there are only six boys in shop per day in a small school, a personnel system should be set up for them. The boys should be taught how to work with each other. One may be a foreman or a group leader, one a tool man, etc. Let them learn the principles of dealing with people the way it is done in an adult world even if it must be done in some extra period. It would be a good idea to assign these specific jobs on merit. It shouldn't be done by ballot because it is not done that way in industrial situations. Men are *promoted* to leadership jobs. Teachers can get more assistance this way from the students in running their shop. Remember, it is not the project and the skills that are important in teaching. Subject matter is taught to students to develop them. Projects are only the vehicles on which the boys and girls ride to maturity under guidance. This cannot be stressed too much. When your students graduate and look for jobs they are the school's product. They show up at the employment office to sell *themselves*. It has been found that at least in 75 per cent of the cases of failure to hold jobs, the job was lost because of human frailties other than lack of job skills. Because of the realistic setting in the school shop, a shop teacher can do the best job of any of the teachers in helping the students to maturity.

Acquiring Good Habits

5. A fifth suggestion for equipping the student to enter industry is the cultivation of a set of reliable work habits. Work habits have a definite relation to personality adjustment. Where else in the school is there as good a place to cultivate personality adjustments through work habit patterns as in the shops? Good work habits are an essential foundation of mental health. Youth does not fulfill its creative potentials or achieve maximum mental health unless it is able to make its contribution through efficient work habits. Occupational therapy is one of the successful methods used in treating maladjusted personalities. In our complex society free citizens work co-operatively in more or less regimented industrial systems. To an increasing degree, each person must face the problems of adjustment to a complicated social and economic system which places great stress on productivity, creativeness, emotional stability, and good interpersonal relations. It seems that problems relating to training young people in good work habits have been left almost entirely to chance, or at best dealt with only haphazardly. Industrial techniques have not been sufficiently individualized so that the vocational strengths and weaknesses of each person can be identified and the right training instituted. Good work habits are acquired by intensive training in accordance with the principles of learning. The learning process involves a number of standard operations like motivation, steps necessary to learn, mechanics of accomplishing them, and practice opportunities. Work habits are behavior patterns. Work habits consist of factors such as, seriousness of purpose, industry, initiative, perseverance, concentration, self-criticism, time budgeting, following instructions, accuracy, etc. With shopwork as a medium these factors can be taught and faulty habits can be corrected. Some research on work habit identification and instruction will pay big dividends.

An expanding U. S. economy demands more scientists, engineers, and trained technicians to create better production tools and provide the knowledge necessary to use them, Dr. W. R. G. Baker, General Electric Vice-President and general manager of the company's Electronics Division, said.

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

INDUSTRIAL-ARTS TEACHER RECRUITMENT

THE question of recruiting industrial-arts teachers for the present needs of the schools of this country came in for lengthy discussion at one of the sessions of the Industrial Arts Conference recently held at Chicago.

The need for teachers of this kind was plainly shown in a table listing the requests received by 26 teacher education institutions (not in the conference), and the number of placements made.

The information given by the table was really alarming. Those 26 institutions got a total of 5189 requests for teachers but they could furnish only 700 teachers to fill the demand. The 4489 difference between the number needed and those that could be furnished, shows the shortage of teachers that exists in the industrial-education field, and plainly pictures what our country has to face.

Some of the suggestions given to alleviate this condition are not new. Nevertheless they may assist in orienting some of those on whom fall the duties of recruitment. It is a problem facing all of our educational organizations as well as every teacher in the field.

National organizations could well use their efforts to foster surveys to give an over-all view of the great need. They could also help to encourage the organization of Future Teachers of America clubs in junior and senior high schools, and in the colleges and universities of our country. Teacher education institutions could also conduct conferences and workshops at which high school students could learn from teachers what the teaching profession has to offer.

We must have more, many more industrial-arts teachers. Everyone in our field must do his utmost to help this recruitment. Let each and everyone do his part to encourage those properly disposed to enter the field of teaching industrial arts so that the future youth of our country will be prepared to adapt themselves to the conditions that surround us in this age of science, progress, and inventions.

THE NEW YEAR

IT IS a trite saying that good resolutions should be made as we are nearing the new year. We all know how easily these resolutions can be broken, and how often we have quickly forgotten those made in the past. However, it is better to make a new set of good resolutions, than to just drift along without thinking of how we could improve ourselves and the work we are engaged in.

As an aid to those who want to check over the things that they are already doing in their industrial arts and vocational education courses, and those things that they have put aside for later consideration the following items, incomplete as they may be, are jotted down.

First to be considered, of course, are the students who attend our classes. How are your relationships with these youngsters that you are trying to prepare for their future assumption of responsibilities as members of homes, homemakers, members of their communities, members of organizations of various kinds, and employees or employers in various types of undertakings with which the workers of the world earn their livelihood? Have you tried to shape their characters as well as to give them the knowledge of how and why, and the skill to do? Have you established amicable relations with each and every one of them?

Probably these few questions will point out ways and means for making your future life as a teacher much richer than it has been in the past.

The next field to be scrutinized is your way of teaching your subject. Are you a master teacher? Have you prepared a course outline so that you know at all times in what direction you are leading your students? Do the students know what you are trying to do with them? Have you improved that outline from time to time or are you satisfied to go along, year after year, with something you have prepared long ago? Have you devised at least one new teaching aid since last September? Do you make use of your chalkboard and your bulletin board as much as you should? Have you tried the value of mottoes and slogans in your shop? Have you instilled the idea of safety into your pupils, or are you using safety cards that are so old that they no longer alert your students? Have you really interested your boys in the work which they are doing in your shop?

Next comes the physical aspect of your shop. True, it may have many shortcomings and be thoroughly unsatisfactory to you. But what have you done about making it more effectual for your work? Have you made a layout of the room and tried to see what a shifting of benches, machines, etc., would do for you, your course, and your students? You may not be able to change the shape of the room in which your shop is located, but changing your equipment may give it a new look which will help materially to make it a more inviting place for you to work in.

Probably the foregoing hints may suggest a few new year resolutions that may be worth while. At any rate, it is something that you may wish to consider.

VOCATIONAL EDUCATION PLUS PERSISTENCE

A GOOD example of what vocational agricultural education can do is demonstrated by the achievements of an Iowa veteran who was named "G.I. Farmer of the Year" at the Centennial State Fair this fall in Iowa.

This 31-year-old veteran bought 160 acres of low-cost acreage rated as being about the poorest in Iowa when he returned after serving in the armed forces.

After clearing the land and attempting a few crops he realized that he needed training. He enrolled in an institutional on-farm training course under the G.I. Bill. This program combines classroom work with supervised experience on the farm.

He concentrated on raising feed crops because his plan was to raise hogs. He applied himself well, conquered the erosion troubles on his land, and with proper fertilization his feed crops increased from year to year.

His 1954 crops were so plentiful that he bought a dozen registered Aberdeen Angus cattle which will permit him to branch out into dairy farming.

The success that this young man had because of his G.I. training impressed some of the neighboring farmers and they are beginning to use the same methods that have made his farm so productive. These neighbors have learned that vocational education is worth while and they are proceeding to profit by this knowledge to overcome erosion and step up the productiveness of their own farms.

A Study of the

Reading Characteristics in a Vocational-Technical School

WALLACE L. GOLDSTEIN
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J. M. Wright Technical School
Stamford, Conn.

It is essential that teachers of English identify the reading abilities, interests, and habits of their students so that proper reading guidance may be provided. This is especially true in a vocational school where there may be so many diversified interests and the students may need special incentives to read.

At the J. M. Wright Technical School, Stamford, Conn., an investigation was conducted to discover the reading abilities, interests, and habits of the students so that teachers could become more familiar with the students' reading characteristics. In this way, it was hoped to get the students more interested in reading and then expand their reading, according to their reading tastes and abilities. A survey was made of the 250 students in the tenth, eleventh, and twelfth grades of the school. The results proved to be very enlightening.

As a result of classroom discussions and general observation, it was believed that students enrolled in the different shop departments had distinctive reading tastes. Therefore, it was decided to find the general reading abilities, interests, and habits of each department. In addition, it was believed that students having different reading abilities might have different reading habits and interests. Therefore, an attempt was made to discover the reading habits and interests of those students having a reading grade level of from five to eight and those having a reading grade of from nine to twelve.

In order to determine if differences existed in the reading characteristics of students in the various classes, the results of the investigation were also differentiated according to the students in the tenth, eleventh, and the twelfth grade. Finally, the reading characteristics of the entire 250 students were identified.

The first test administered to the students was the Gates Reading Test which measures reading comprehension, speed, and vocabulary. It is possible, as a result of this test, to determine the reading grade of each student. It was found that the average student in the school had a reading grade of 8.6. The lowest reading grade was 4.9 and the highest was 12.0. Fifty-four per cent had a reading grade of from 5–8, while 46 per cent had a reading grade of from 9–12.

Reading grade averages for the various departments were then computed. The beauty culture department, composed mainly of girls, had the highest average reading grade, 9.6. Other shop reading averages included printing, 9.0; electrical, 8.9; drafting, 8.8; machine, 8.8; sheet metal, 8.4; carpentry, 8.1; and automobile, 8.0. It is interesting to note that students in the beauty culture department are highly rated because of special screening before entering the school. Furthermore, Raymond E. Towne, head of the printing department, believes that reading skills are essential to a good printer and stresses them in his work. The printing department had the second highest average. Moreover, it was found that reading grade averages were higher in the higher grades. The tenth-grade average was 8.1, the eleventh-grade average was 8.5, and the twelfth-grade average was 9.1. This may help to bolster the theory that improvement in reading may take place even at the high school level.

After the reading tests were administered, the students were given the *Inventory of Reading Interests*, an inventory devised by Clifford Woody who was an outstanding reading practitioner. This inventory attempted to find the areas in which students were interested in reading. It was divided into ten sections and included adventure, history, biography, science, fantasy, animals, hobbies, manners, sports, and travel. According to the results of the *Interest Inventory*, the 250 students examined were mostly interested in stories about adventure, history, and animals, but showed an extreme dislike toward reading about fantasy and hobbies.

In addition, the reading interests prevailing in the different shops were ascertained. Beauty culture students were mainly interested in reading books on proper manners and behavior. They revealed a dislike for books on science. Printing students were mostly interested in sport stories and biographies but disliked fanciful stories. Electrical students were fond of stories of adventure and also disliked fantasy. Drafting students preferred stories about animals while machine-shop students seemed to prefer stories about adventure and history. Sheet-metal students preferred adventure and travel while carpentry and auto students were mostly interested in adventure and history. It is also interesting to note that tenth graders, as a whole, preferred animal stories; eleventh graders preferred adventure and history, but twelfth graders were mostly interested in those books on manners dealing with making a good appearance, dating, correct dress, and entertaining friends.

In addition to taking the reading tests and answering the *Interest Inventory*, the students also completed a questionnaire that attempted to discover their reading habits. Students were asked questions that would reveal how many books they read, the number of books accessible in their homes, their favorite magazines, their reasons for reading books and magazines and other pertinent information. Such reading habits were discovered for each shop, each grade or class, and for the entire 250 students who filled out the questionnaires.

The following information was gathered as a result of the questionnaires on reading habits: (1) Students read an average of about five books a year. (2) The majority of the students had between 5 and 15 books in their homes. (3) Most students liked to read "sometimes" but did not read as much as they desired because they worked after school and week ends. (4) Students read chiefly for: (*a*) pleasure, (*b*) knowledge, (*c*) association of their lives with the characters about whom they read.

Furthermore, the students voted *Life, Hot Rod, Popular Mechanics, Field and Stream,* and *Sports* magazines as their favorites. Most students read only their local newspapers and were most interested in reading the sports page, comic strips, and then the local news.

Particular reading habits were noted in the various trade departments. Students in the beauty culture and printing departments rated highest in reading average, than students in any other department. Students in the carpentry and automobile departments read the least number of books, on the average. This information is significant in view of the fact that the students in the former departments rated highest in reading ability, while students in the latter two departments rated lowest. It is also interesting to note the magazine preferences of each shop. Beauty culture preferred *Seventeen;* printing preferred *Sports* magazine; electrical chose *Popular Mechanics;* drafting selected *Field and Stream;* machine preferred *Life;* sheet metal chose *Sports* magazine; carpentry selected *Life;* and automobile students preferred *Hot Rod.*

A noteworthy distinction was observed in the reasons for reading given by students in the tenth, eleventh, and twelfth grades. There was a noticeable increase in the number of students who read for the purpose of gaining knowledge or information from the tenth to the twelfth grade. The older students selected books that would supply them with information and which were mostly nonfiction.

Another division of students was made in order to determine the interests and reading habits of those with reading grade levels of 5–8 and those in the 9–12 range. Noticeable differences and some similarities were revealed. As far as interests were concerned, both groups preferred practically the same kinds of stories including those about adventure and animals, and stories with a historical background. Both groups showed an extreme dislike for fanciful tales. These results tend to support the theory that children with different reading abilities may have common reading interests.

However, many differences were found in the reading habits of the two groups. Students in the 5–8 group read an average of three books a year compared to an average of eight books a year read by students in the higher group. It was also noted that students in the 9–12 group had more books in their homes than the lower-group students. Forty-five per cent of the students in the 9–12 group stated that they really liked to read most of the time, but only 7 per cent in the 5–8 group declared that they were interested in reading at all.

The results of this investigation reveal that there are differences in the reading characteristics of students of the J. M. Wright Technical School in so far as shops or departments, grades, and reading ability groups are concerned. Some of the results have already proved valuable in providing reading guidance for individual students and in the purchase of reading materials.

Problems and Projects

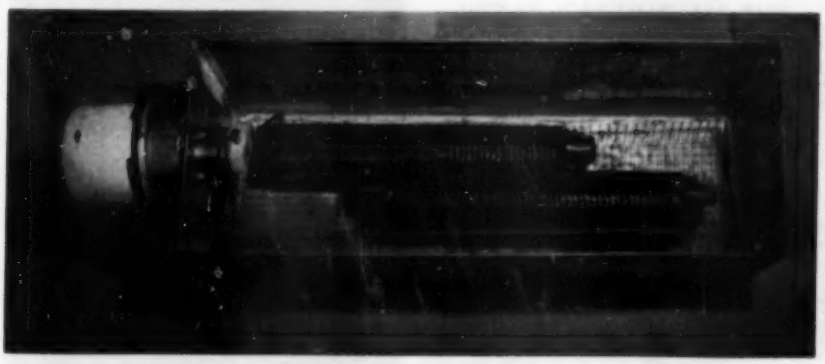
CLEANING AND OILING KEYBOARD CAMS

KENNETH L. ROSS
Instructor, Printing Department
Ferris Institute
Big Rapids, Mich.

To speed up the cleaning of the keyboard cam assemblies and the channel entrances in the shop, we use a tank made up of 12-gauge metal. The dimensions are 10 by 12 by 28 in., with a drain cock installed in the bottom.

It is possible to agitate the solution in this tank by installing a couple of lengths of copper tubing drilled every half inch with a No. 52 drill. However, many shops do not have compressed air available (including ours), so we were forced to use another method.

A used portable washing machine motor was installed at one end of the tank above the solution level. A connecting arm was attached extending from the reciprocating shaft of the motor to a basket of hardware cloth mounted on ¼-in. stove bolts. These bolts should be at least 2 in. off the bottom of the tank to allow for the motion of the basket.



Cleaning and oiling keyboard cams

We have tried two solutions to clean the assemblies. We used potassium dichromate, at 55 cents per lb., from a local drug house. Four tablespoons of this was mixed with a gallon of water and a little *Tide* or other detergent. The solution should be as hot as possible and agitated for about 15 minutes. Then rinse the parts with more hot water and detergent. This solution is harmful to the hands and rubber gloves must be worn when working with it. It is difficult to use but it is reasonable in price. Sodium thiosulphate solution can be used to neutralize any of the acid spilled on the hand.

At Ferris Institute we use the more expensive carbon tetrachloride and agitate the parts for at least 20 minutes. It is safer and easier to handle, and the parts dry almost instantly. Before putting the frames back on the machine, we use an old hypodermic needle to oil the cams right in the frames. This is a saving of about two hours down time for each machine for us. Total cost for the tank, motor, and carbon tetrachloride was about $20. We strain the carbon tetrachloride each time we drain the tank and use it over again.

LAZY SUSAN

SCOTT WILLIAMSON
Wichita Falls, Tex.

The Lazy Susan, a good wood-turning project, is often left off the list of projects because of the cost of or difficulty in securing bearings.

The problem can be easily solved by the use of marble bearings. While the base is on the lathe cut a ½-in. race on a 4-in. center with the round nose scraper. Make the race depth approximately ⅛ the depth of the marble diameter. No race is needed in the tray or top piece.

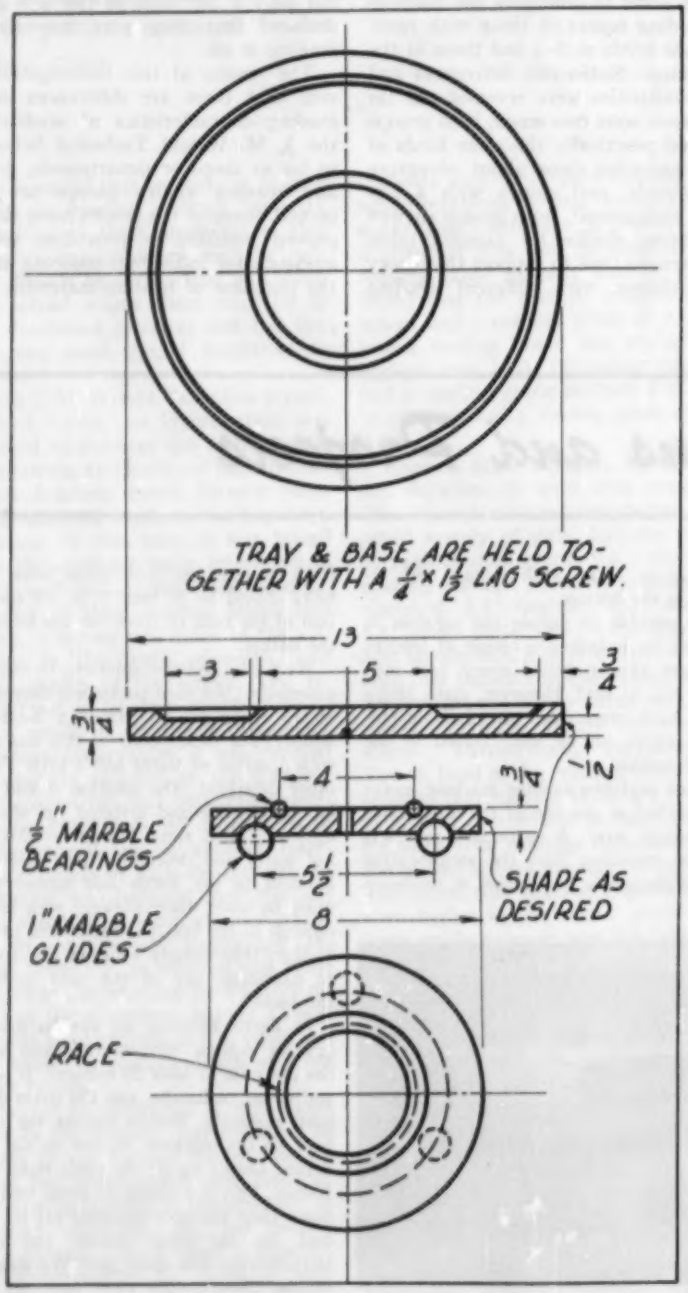
A sack of marbles at the *Five and Ten* contains various sizes. To select the marbles for the bearings, fill the race and place the tray on the marbles. Remove the large ones and replace until all the marbles touch the tray. This type of bearing is very satisfactory and has stepped up the production of Lazy Susans considerably.

The three marbles in the bottom of the base are glued. To secure them, bore a hole the diameter of the marble only ¼ in. deep. Round out the bottom of the hole with a gouge to give more surface contact.

The Lazy Susan described here is one of our most popular sizes. However, the size will be determined by the size of the dishes used. Some shops have more than one size mold for ceramic dishes, thus offering a variety in production. For those who do not have ceramics they will find the Lazy Susan is still a practical and interesting project.

The one described here is made with several variations. The edges are shaped with various patterns. The center piece in some is left in as shown, is removed, and in some the center recessed to receive the deeper dishes.

The tray is fastened to the base with a ¼-in. lag screw. The length will be determined by the depth of the race. A 1½-in. length can be used when the marbles are set in as described above.

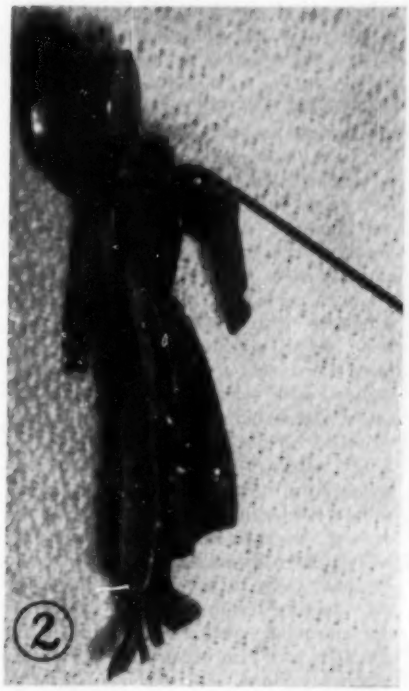


Details of the Lazy Susan

GUATAMALAN GAMBOLEERS

SIMON S. PALESTRANT
Bronx, N. Y.

Costumes and characters of other lands hold strange fascination for most of us. It satisfies, in a limited way, the innate wanderlust we so often feel. The male and female figures made of silver, each standing three inches in height make an excellent pair of brooches. They somehow give us a vicarious sense of self-projection into an-

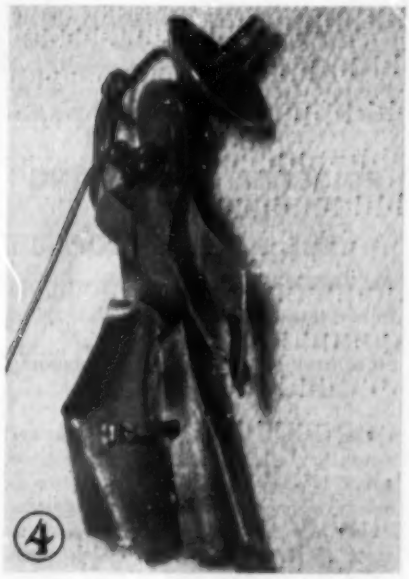


other place and at another time, no matter how restrained it may be.

The parts of the figures, such as the legs, the skirt, kerchief blouse, the hat, the arms, the hair braids, are all cut out as shown in Figures 1, 2, 3, and 4. The surface decoration is stamped on each of these parts, then they are bent to conform to the required contours. The legs are soldered to the skirt and placed to extend to the correct distance beyond its hemline. The arms are soldered in position to the reverse side of the kerchief blouse and the hat parts are assembled to include the hair braid. The three groups are then joined to form the unit — The Guatamalan Girl.

The male counterpart is constructed in the same manner. Small sections are cut, shaped, and joined. These are finally assembled into the whole figure of the Gautamalan Gaucho. Together they make a very interesting matched pair of pins.

They may be buffed to a high gloss or finished in antique toning. To get the former finish, rub the brooch with a paste of bicarbonate of soda and water. This removes all oxidized stains and cleans the metal thoroughly. The polish is gotten in the soft cloth buff over a thin rub-on of jeweler's rouge.



To antique the brooch, first stain all low areas of the brooch with an aqueous solution of potassium sulphide. As soon as the stain has become complete (very dark), dry it. Then rub up high lights with pumice and oil paste. The exact area of light to be rubbed up depends upon how dark or light you would prefer it to be. Rinse, then buff it with jeweler's rouge, followed with a soft cloth.

METAL CASTING IN THE SCHOOL SHOP

S. G. HAGEN

Richmond, Calif.

In my experience as a shop instructor and tradesman I have encountered few student shop activities which can compare with metal casting as an interest builder. There is something about the process that seems to intrigue the student; even the chore of tempering the sand doesn't seem to slacken his desire to complete the mold and pour the molten metal. And *shaking out* the mold to expose the finished casting is analogous to the grab bag type of activity, he cannot wait to see what he's got.

Materials required for metal casting are few, chiefly molding sand, which can be purchased from any foundry supply house, a few pounds of parting sand, and a supply of metal. We use scrap aluminum in our shop, mainly aluminum pistons, cylinder heads, and other parts of junked autos. Aluminum melts at a relatively low temperature, is light, inexpensive, and easily machined. The castings shown in Figure 1 are all made from aluminum scrap.

The equipment required for casting can be purchased or made in the shop. We have some of both and find that the homemade variety is satisfactory for our needs. The minimum items of equipment for aluminum casting consist of a two-part flask, a couple of mold boards, a sprue cutter, a gate cutter, a venting wire, a fine mesh cloth bag for parting sand, a melting pot, a riddle, a rammer, and some means for melting the metal. We use an open top gas forge for melting but we are contemplating the acquisition of a crucible type pot furnace. The castings in the photo were molded in a two-part flask, each part of which measures 3½ by 12 by 14 in. outside. It was made of ¼-in. hardwood in the school woodshop and fitted with pins in our machine shop. All of the items sketched here can be purchased at reasonable cost from a foundry supplier but they can easily be made up from existing materials for practically nothing, an important consideration for schools with a limited budget. A box or mixing bin capable of containing about 100 lb. of molding sand will also be required for tempering the sand.

I am not going to outline the procedure for making up a mold since this can be found in a number of texts on the subject. But I would like to point out several mistakes that beginners frequently make. First of all, they have a tendency to ram their molds too tightly. Gases must be allowed to escape from the mold, and a too tightly rammed mold will not allow for this. Overheating the metal should also be avoided. If the aluminum glows red it is probably too hot. Here again experience is the best teacher but generally speaking, fluidity at the lowest temperature will result in less gas accumulation and sounder castings. The metal should be silvery in color when it is poured. Gates should always be made ample, better too large than too small. Several gates distributed around the mold cavity will frequently aid in filling a difficult mold. Too much moisture in the sand will cause excessive gassing, just enough water to hold the sand particles together is desirable. These are some of the pitfalls that beginners encounter; you will probably experience others but the solution for them is a challenge that both students and teachers will enjoy overcoming.

Probably the greatest deterrent to the teacher's use of metal casting in his shop

Fig. 1. Aluminum castings

program is the problem of patterns. Patterns of course are required for all castings and they do require a certain amount of time and skill in their construction. If your woodshop instructor has had experience in patternmaking it might be possible to enlist the aid of his students. Sometimes a boy in your own class with special ability and interests can be found who would benefit from the experience. I have personally done all of my pattern work and have not found it too time consuming. In addition to the disk sander patterns I have managed to complete those for a saber saw, steam engine, a micrometer frame, pancake griddle, and others.

The disk sander is a required project for beginners in my vocational machine-shop class. In addition to the foundry experiences there are many basic machining operations involved in the completion of the tool. Just another point in favor of metal casting as a part of the course of study. To give a boy a piece of steel and have him make chips out of it on the lathe is not machine-shop training. Only by providing reasonable facsimiles of the jobs encountered in industry can we illustrate industrial procedures. Student reaction to jobs of this sort is especially gratifying also. Enthusiasm and interest are high, disciplinary problems become extinct, and pride of accomplishment is mirrored in the face of every boy who completes the job.

POLYESTER COLD-SETTING PLASTICS IN THE SCHOOL SHOP

ALEXANDER F. BICK

Milwaukee, Wis.

(Continued from page 346 of the December, 1954, issue)

The typical new materials of the age definitely belong to the curriculum of school shops. Plastics have won a place as one of the important segments of industrial effort in a comparatively few years, so much so that few students in our shops today will not have need of more specific knowledge about them in the years ahead.

It is not the purpose of this article to recommend a plastics course as such. Plastics should be taught first in combination with wood or with metal, to produce the dual-material articles seen in the present trend. By teaching it in that manner, and without benefit of a full semester's time, enough contact with plastics may be given the student now to supply him with the necessary knowledge.

Such combination courses will prove advantageous, not in the student interest area alone, but the tendency in them is to sharpen the emphasis upon important criteria and to drop unnecessary detail in a way that might not be possible in a full semester's program. Teaching plastics and wood, or plastics and metal together, affords the student the rare benefit of comparisons and combinations that lead to better understanding of a variety of materials and industrial problems.

This approach offers the teacher an opportunity to keep in step with the times without disrupting his program, and if his decision is equal to his conviction, his willingness to forge ahead with the trends, will be a credit to him and his school. He may simplify the first offering, concentrating upon one good model in the initial semester, and then expand his line as his experience allows.

The next question is, "What plastic?" The logical answer is, since this material is a chemical product, that the classes deal with it from that angle. It is far better for the education of students when they work with and experience the gelation and polymerization of liquid plastic in the process of creating castings over their own molds, than when they merely shape articles from commercial plastic sheet. The transformation of liquid into a solid is an amazing demonstration of chemical reaction, and student satisfaction is great. I would not hesitate to include the making of articles from commercial sheet, but teachers will favor the creative opportunities in the casting of polyester cold-setting resin, examples of which are appended to this article.

It should be remembered in this connection that of the mass of plastic parts and products manufactured today, by far the larger portion are castings from dies in heavy machinery. Another large part are coated fabrics and wrapping film. Still another concerns itself with spun fiber thread, woven into cloth for wearing apparel. A small segment of the business is devoted to the fabrication of building and advertising items from sheet. The conclusion, therefore, is that a better representation of the plastics industry is to be found in the liquid casting process, machine casting being prohibitive or noncreative, and chemical formulation being out of bounds.

Can polyester plastics be used in the average junior and senior high school? The answer is, "Yes." The work being shown in this series is that of present seventh- and eighth-grade classes. The process is so simplified that with standard planning

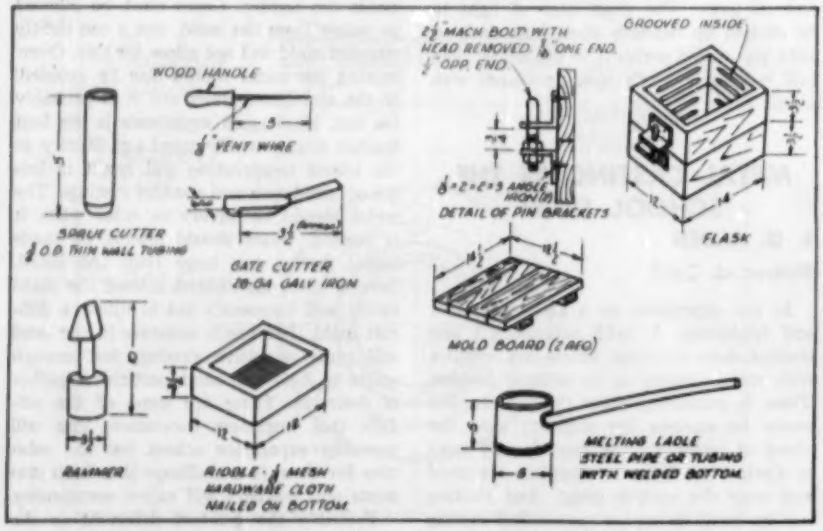


Fig. 2. Metalcasting equipment for the school shop

and organization, much may be expected on these levels, and of course, much more will be forthcoming from the higher grades.

Formulas are furnished, there are only two basic materials to handle — heat and extra equipment are not necessary. Slight variations in mixtures are not troublesome, and supplies are quickly available. This does not mean that care is not required. It is reasonable to expect that a new product calls for a new approach, but within it is new interest and new life. To see the casting done would easily sell the idea to a teacher.

The feature of this month's article is the casting of a laminated Fiberglas-plastic chair, built up of one layer of Fiberglas cloth and one or two Fiberglas heavy woven mats, giving a wall thickness of 5/32 in. This thickness of casting gives a rigid and strong section.

Since these are relatively large items, they need to be viewed together with the smaller projects of last month's article and the still larger one (a 12-ft. boat to appear in a later issue) to appreciate the versatility of this new teaching material. It is the material of laminated automobile and airplane bodies, and its strength is fully adequate for these and any other uses needing strong, thin-walled construction.

The illustrated chair is made as follows:

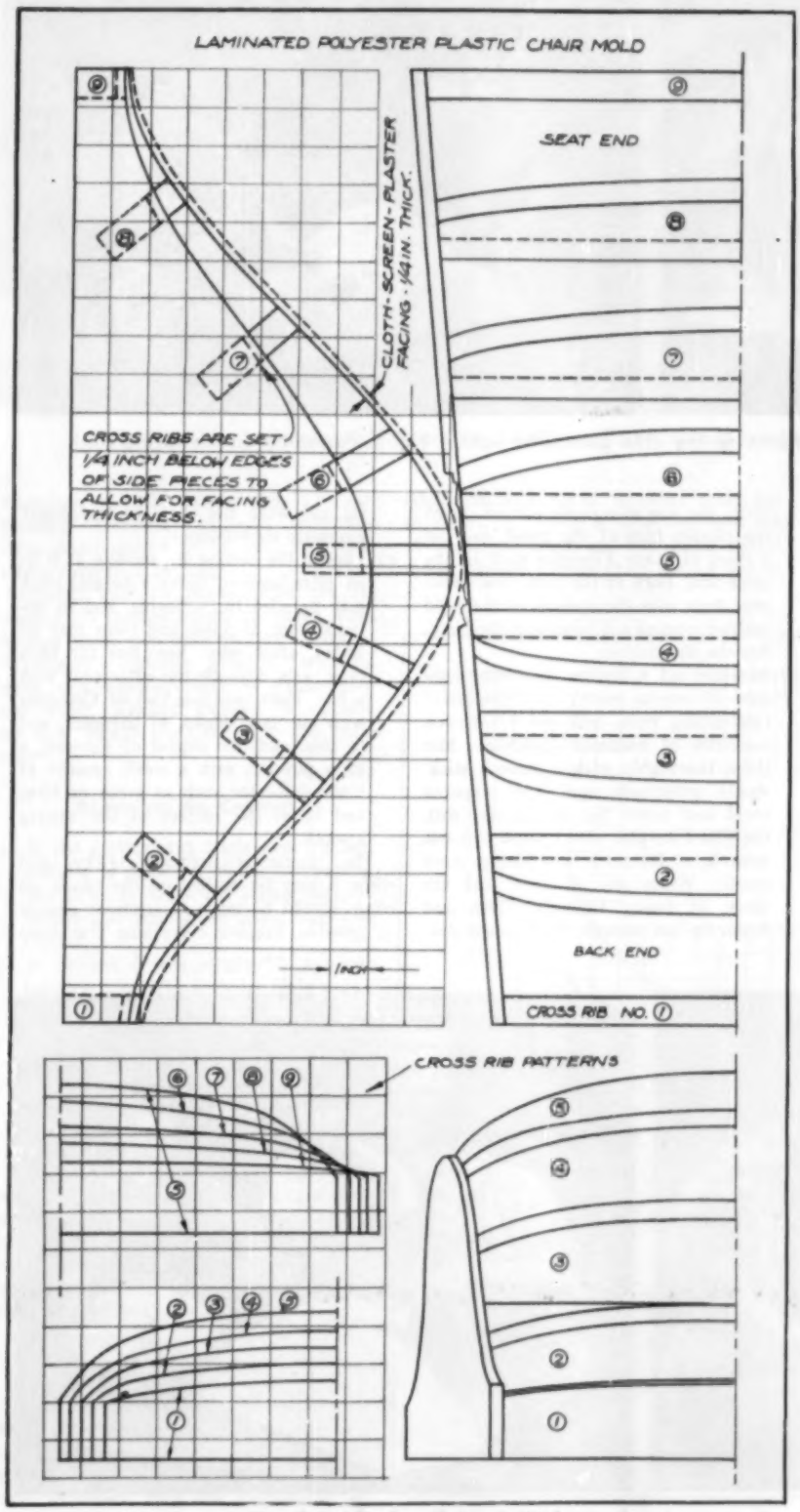

LAMINATED POLYESTER PLASTIC CHAIR MOLD
SEAT END
CLOTH-SCREEN-PLASTER FACING - 1/4 IN. THICK.
CROSS RIBS ARE SET 1/4 INCH BELOW EDGES OF SIDE PIECES TO ALLOW FOR FACING THICKNESS.
INCH
BACK END
CROSS RIB NO. 1
CROSS RIB PATTERNS

Fig. 1. Details of the mold

Making the Mold

a) The detailed drawing in Figure 1 shows dimensions and shapes of 11 wood parts that make the mold. These are cut from western pine and nailed into position, as shown. Then end cross ribs, 1 and 9, are fastened to the sides first, and all others are trimmed to fit their places thereafter. They are all set ¼ in. down from the edges of the sides to make room for an approximate ¼-in. facing over their entire area of cloth, ¼-in. mesh wire screen, and plaster of Paris. The cloth confines the plaster, and the wire screen reinforces it. See Figures 3 and 4.

b) Enough plaster is mixed to cover the mold in one operation. It is troweled on evenly, with special attention to low spots. Later, at the half set stage, the plaster is scraped smooth with a metal edge. At the dry stage, it is further scraped, filed, and sandpapered.

Mold Release

Two procedures are presented. In the event that the key material for process *a* is not available, process *b* may be used. It is preferred that the reader use the *a* method.

a) This simple method of releasing the casting from the mold consists of covering the raw smoothed plaster face of the mold with 1/16-in. thick pure rubber sheeting cut 2 in. oversize all around, drawn taut and tacked on four sides into the wood frame. Tacks are driven in halfway for later quick removal. Pure rubber sheet is purchased from an industrial rubber goods supplier.

Fig. 2. Fastening the cross-rib patterns to the side pieces. At right — Fig. 3. Fastening on the facing cloth

b) The mold release procedure of the second choice is:

1. Coat the thoroughly dried and smoothed mold with two applications of catalyzed "Castoglas," leaving the surface uniformly glossy.
2. Coat generously all over with two applications of Castoglas Mold Release solution, waiting for complete drying between coats.
3. Add two coats of car wax, allowing plenty of time for each to set.

Making the Casting

a) Anticipating all needs, lay out newspaper under the mold, set all supplies and tools into convenient order for quick use, cut a sheet of Fiberglas cloth, the size of a paper pattern, to fit the plaster face of the mold, and cut a sheet of heavy Fiberglas cloth of the same size. Both of the latter will probably draw over the contour of the mold without cutting and lapping at the bend. See the illustrations.

b) Measure out 4 kitchen measuring cupfuls (8 ounces each) of "Castoglas" cold-setting resin, and add 4 teaspoon measures of hardener (catalyst). Mix these thoroughly with a smooth stick. Apply generously over the prepared mold and cover the wet plastic with the first Fiberglas cloth. Brush this out smooth, at the same time adding more plastic. When wet all over, add the sheet of heavy Fiberglas cloth and brush the last smooth. Add enough plastic and work the sheet to completely eliminate air bubbles.

c) Though the casting is complete as it is, an extra layer of heavy Fiberglas cloth may be aded for stiffening, and an optional coat of finish and color may be added, after what has thus far been done, gels. Smooth the outer coat with a file. Then, mix one cup of *Castoglas* with one teaspoonful of hardener, and to this, add one cupful of *Castosil*, a glass powder, with a small amount of *Castoglas* color such as green or blue, and brush the surface of the casting smooth.

The plastic is naturally sticky, and while it may be washed off the hands, an effort should be made to work as cleanly as possible, keeping everything free from

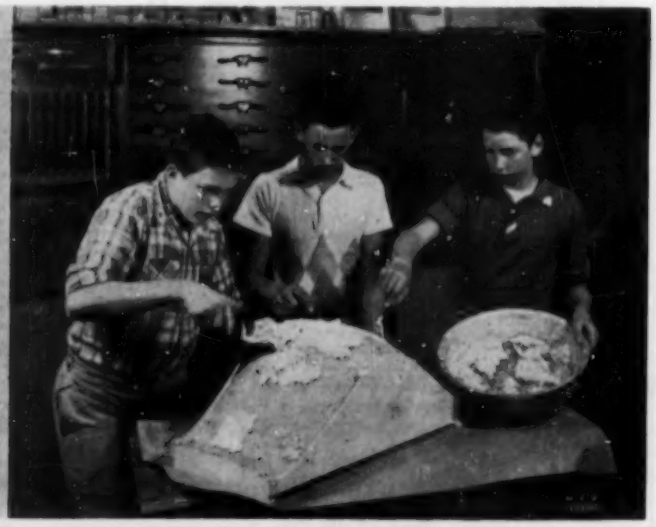


Fig. 4. Fastening the ¼-in. mesh screen in place. At right — Fig. 5. Troweling on the plaster

Fig. 6. Releasing the casting. At right – Fig. 7. Sandpapering the finished casting.

drippings, and the fingers dry. Use dispensible containers and paper measuring cups, wood mixing sticks, etc., and keep tables covered with paper.

Brushes must be cleaned after use, removing all surplus plastic in paper, then dipping them and working them clean in "Castoglas" cleaning solution, wringing them, and washing them in strong soap and water. Kitchen cleanser is suitable for this. Hands are cleaned in the same order.

Removing the Casting

a) If the casting was made over rubber, removal is merely a matter of drawing the tacks by which the rubber was attached and peeling the latter from the casting.

b) If process *b* was employed, removal becomes a careful, little by little working off of the casting from the mold by means of a large, pliable kitchen spatula or with a strip of thin, pliable metal, rounded at the tip.

Trimming

The hard casting has sharp edges and should be handled with care. Edges that cannot be cut to a penciled line with heavy tinner's shears must be sawed off with a coping saw. The casting is then filed and sanded, and edges may be finished with plastic. See Figure 7.

Legs

These are made of ⅜-in. round iron or brass rod, welded or brazed to the approximate dimensions given, and of about the same pattern, if made of metal; but if of wood, as shown, they are constructed of 1-in. hardwood dowel, brass tipped, and reinforced with 5/16-in. diameter brass rod as shown in Figure 8. The top bars are ¼ in. round brass, set into holes drilled down through the center of the leg top to a depth of 1 inch. All rods are roughened and set into holes with plastic. The assembly is then attached to the seat on a sandpapered area, using "Castoglas" mixed

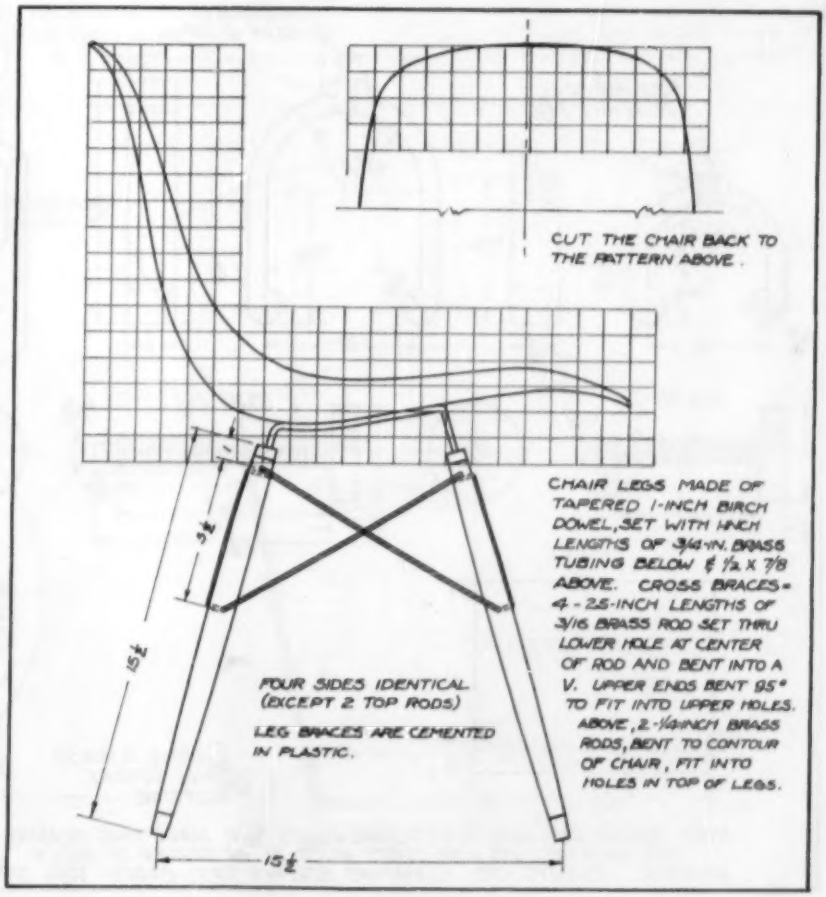

CUT THE CHAIR BACK TO THE PATTERN ABOVE.
CHAIR LEGS MADE OF TAPERED 1-INCH BIRCH DOWEL, SET WITH INCH LENGTHS OF 3/4-IN. BRASS TUBING BELOW & 1/2 X 7/8 ABOVE. CROSS BRACES - 4 - 25-INCH LENGTHS OF 3/16 BRASS ROD SET THRU LOWER HOLE AT CENTER OF ROD AND BENT INTO A V. UPPER ENDS BENT 95° TO FIT INTO UPPER HOLES. ABOVE, 2-1/4-INCH BRASS RODS, BENT TO CONTOUR OF CHAIR, FIT INTO HOLES IN TOP OF LEGS.
FOUR SIDES IDENTICAL (EXCEPT 2 TOP RODS)
LEG BRACES ARE CEMENTED IN PLASTIC.
15½
15½

Fig. 8. The assembly of the chair

with hardener and thickened with "Castosil," as before; this being spread on each side of the metal rod of the lower assembly where it touches the seat. Reinforce this with small squares of Fiberglas cloth, brushed out smooth.

Figures 2, 3, 4, 5, 6, and 7, show eighth-grade boys building the mold shown in the detailed drawing. Later, they successfully cast a chair over a rubber sheet release material. The illustrations of the casting operation and the finished chair being sanded shows the use and product of a second mold, prepared with the *b* release process, later removed with the aid of spatulas. It will be noticed that this mold makes a deeper casting, the back being strengthened by the sides.

The student's cost of the plastic chair complete is $6.

About 80 per cent of the nation's rural roads, including federal and state highways, are surfaced with petroleum-derived asphalt. — *Petroleum Newsnotes.*

REVOLVING V BLOCK

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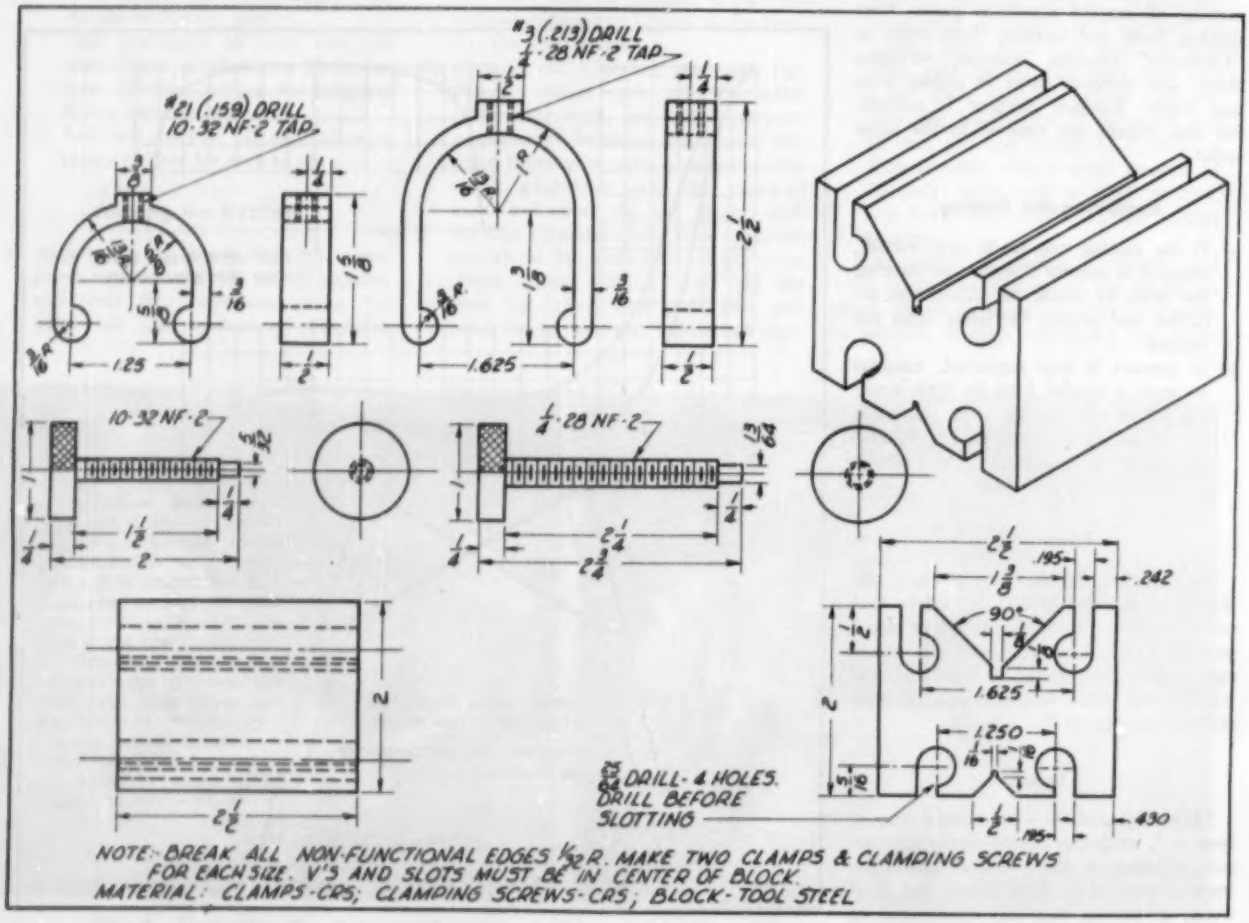
The V block illustrated here is designed for the purpose of grinding flats, etc., 90 deg. apart without interference from the clamps. It is also useful for drilling holes 90 deg. apart. In using it for right angled work, use the block with the clamps up, then revolve the block on either side for the 90 deg. If 180-deg. work is desired, just use the sides of the block.

The block is designed for average or large work in the deep V, and for small work in the shallow V. In machining the V block, care must be used in drilling the holes for the clamps. So that each set of holes are parallel, they should be drilled with the same setup, preferably, clamped to an angle plate.

The block offers a good shaper project, or it could be milled. The clamps offer work in using an independent chuck, because this method permits the boring of the center radius. The rest of the machining of the clamps can be sawed out in a band saw or by drilling a series of holes and working to the line with a file. Drilling and tapping of the clamps should be done last, so as to have the screw in the center.

Student using the V Block


#3 (.213) DRILL
1/4-28 NF-2 TAP
#21 (.159) DRILL
10-32 NF-2 TAP
1.25
1.625
10-32 NF-2
1/4-28 NF-2
90°
1.250
DRILL 4 HOLES. DRILL BEFORE SLOTTING
NOTE: BREAK ALL NON-FUNCTIONAL EDGES 1/32 R. MAKE TWO CLAMPS & CLAMPING SCREWS FOR EACH SIZE. V'S AND SLOTS MUST BE IN CENTER OF BLOCK.
MATERIAL: CLAMPS-CRS; CLAMPING SCREWS-CRS; BLOCK-TOOL STEEL

Details of the revolving V block

They should be drilled while resting on the 3/16-in. radius.

For the purpose of identification, a ¼ by 1½-in. space 1/32 in. deep may be milled in one side for the student to stamp his name in. The student pictured, using the block is Mel Miller (owner), 16 years of age and a first-year student. Photographs by Forrest J. Croop.

ALUMINUM PLANTER JAR

DICK HUTCHINSON
San Gabriel, Calif.

Although most of the illustrations show this very attractive aluminum planter jar being done with metalworking equipment, it may also be made completely by hand.

First, lay out the body of the jar on a sheet of 18-gauge soft sheet aluminum. See Figure 1. If a disk cutter is available, it is a simple matter to cut out this piece, guiding the piece through by hand, as is being done in Figure 2. If the cutter is not available the piece may be cut out by hand, with the tin shears.

It will be found that in cutting metal by hand, that if one handle of the tin shears is clamped in the vise, as in Figure 3, greater leverage may be obtained, and it will be much easier to follow a scribed line.

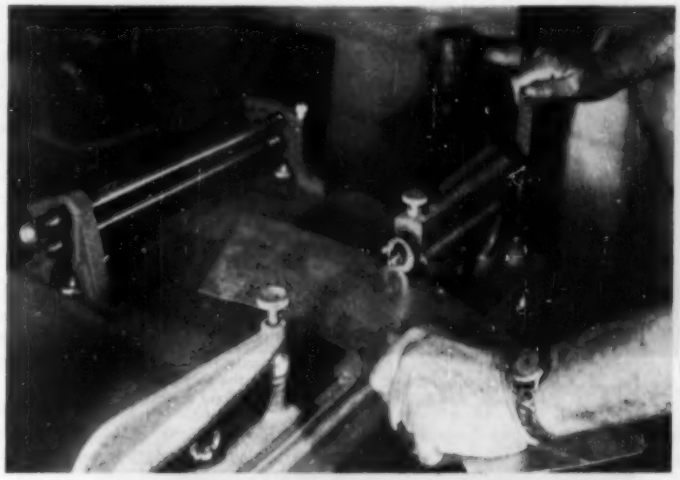
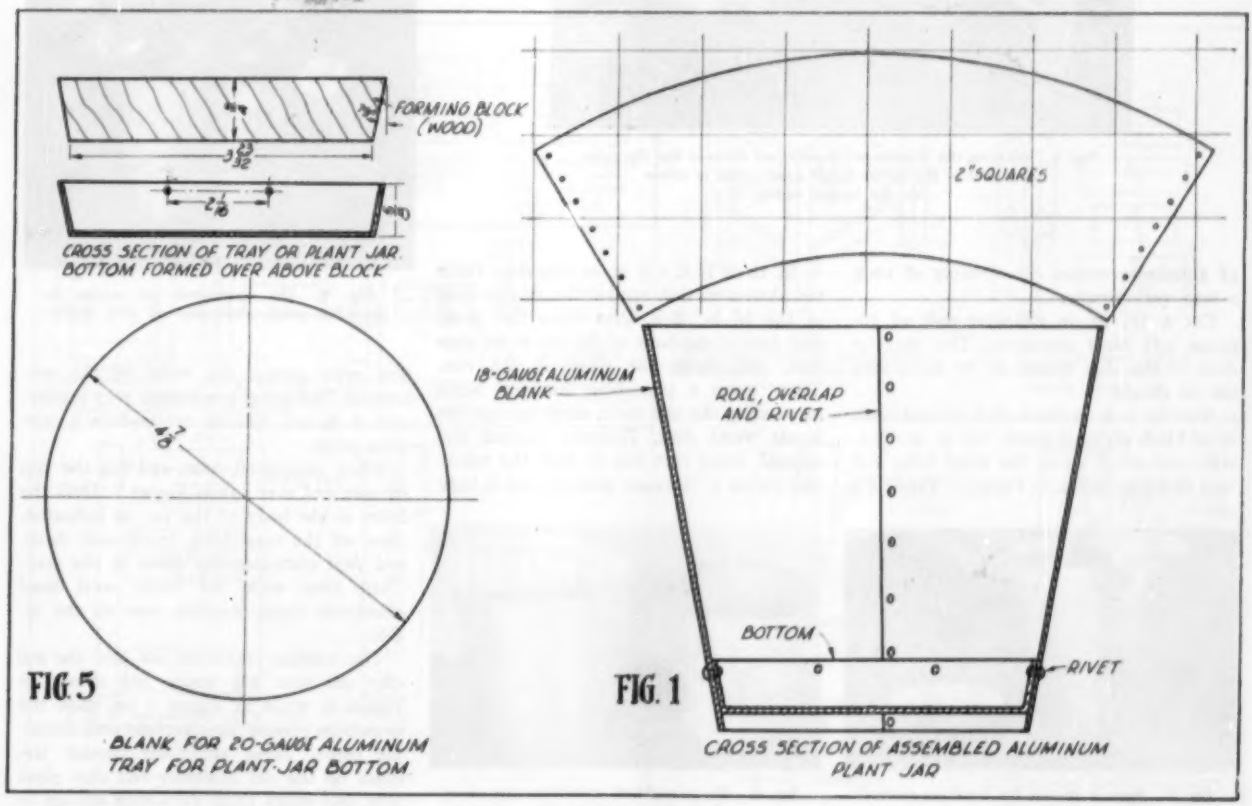


Fig. 2. The slitter is being used to cut out the body for the aluminum planter jar

After the piece has been cut, punch, or drill the holes, as indicated, then roll into more or less of a cone shape, as in Figure 4. Here the left end of the rolls have been left partly open, while the right side is closed to just the thickness of the metal. With this arrangement it is quite easy to feed the metal through faster at the open end, which will result in the larger radius top.

If it is necessary to form the piece by hand, set a large wood dowel up in the vise and form the piece by working it around over the dowel with the hands. Rivet together with 1/16-in. oval head aluminum rivets.

In that it is impossible for the average student, or craftsman to solder aluminum, we make the bottom for the jar in the form of a tray, deep enough to take care of any water drainage, and the flexibility


FORMING BLOCK (WOOD)
CROSS SECTION OF TRAY OR PLANT JAR. BOTTOM FORMED OVER ABOVE BLOCK
FIG. 5
BLANK FOR 20-GAUGE ALUMINUM TRAY FOR PLANT-JAR BOTTOM
2" SQUARES
18-GAUGE ALUMINUM BLANK
ROLL, OVERLAP AND RIVET
BOTTOM
RIVET
FIG. 1
CROSS SECTION OF ASSEMBLED ALUMINUM PLANT JAR

Details of the aluminum planter jar

Fig. 3. Clamping one handle of the tin shears in the vise provides greater leverage, and facilitates the cutting of sheet metals

Fig. 4. Forming the aluminum cone-shaped drum in the slip rolls. One end of the rollers is left open wider to allow for the longer radius

Fig. 6. To make the saucer, or tray, clamp the 4⅞-in. aluminum disk between the two forming blocks, and clamp in the vise; then hammer the rim down evenly all around, as shown

Fig. 9. The completed jar makes an attractive piece when planted with flowers

of aluminum makes the forming of such a tray very simple.

Cut a 4⅞ in. in diameter disk of 20-gauge soft sheet aluminum. This may be done in the disk cutter, or by hand with the tin shears.

Now cut a ¾ in. thick disk of hardwood, or of birch plywood about 5½ in. in diameter, and set it up in the wood lathe and turn down, as shown in Figure 5. Then cut a ⅛ in. thick disk 3½ in. in diameter. Place the aluminum disk against the smaller side of the ¾ in. disk, then place the ⅛-in. disk against the back of the metal for support, and clamp the whole in the vise. Then, using a planishing hammer, begin hammering the rim down easily against the larger wood disk. Hammer around and around, using care not to kink the metal. See Figure 6. Hammer until the rim is tight and even against the wood all the way around. This metal compresses very readily, and it is not difficult to produce a nice even piece.

When completed, trim and file the rim smooth and even, as in Figure 7. Drill the holes in the body of the jar, as indicated, then set the tray down inside and mark, and drill corresponding holes in the tray. Then rivet with the 1/16-in. oval head aluminum rivets, heading over on the inside.

The finished aluminum jar, and the red clay jar that fits inside are shown in Figure 8, while in Figure 9 we show the aluminum planter jar complete with flowering plant. These aluminum planter jars dress up the old unsightly red clay plant jars, and make them attractive enough to fit into any room in the house.

Fig. 7. Here is shown the back, or riveted seam in the jar; also the saucer that is to be riveted in to form the non-leak bottom

Fig. 8. The completed aluminum jar, and the ordinary red plant jar that fits inside

IDENTIFYING PARTS WITHIN A WOODWORKING PROJECT

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An important phase of the teaching of woodwork, often underemphasized, is the proper identification of all pieces in a specific project. If there is no method of marking each piece, the student may assemble the parts improperly. The result of his confusion will then be evident in assemblies that are twisted, warped, or off square.

The simple method, described here, of identifying the parts will do much to eliminate the guesswork in even the most complicated project. Suppose, for example, that you want to glue three or more pieces of stock into a panel. After completing such preliminary operations as cutting to the approximate length, planing to thickness, and planing square edges, match the pieces according to their grain pattern and annual rings. When matched they may appear as shown in Figure 1. By next placing two lines across the board to meet in the shape of a pyramid, you may readily identify each piece. See Figure 2. You may want to glue the board together by providing for a spring joint at B and C. Obviously no spring joint needs to be made at A and D. The boards, when glued together, should line up as indicated in Figure 2.

You may wonder what to do when there are a number of panels of similar size to glue. Simply make as many lines as there are panels. If you mark four panels, the first would appear as shown in Figure 2, the fourth as shown in Figure 3. When you need to make more than four identical panels, it would be better to mark them by means of numerals. For example, panel No. 7 would appear as shown in Figure 4, instead of having 7 parallel lines.

Small doors often show a slight warp when taken out of the clamps. Although this may be caused by a number of reasons, it is possible that the individual members were not glued in their proper order. The parts of a small door, incomplete, appear as shown in Figure 5. To mark them for identification, place stiles and rails together in pairs and mark as indicated in Figure 6.

When several doors of equal size need to be laid out, the foregoing procedure for glued panels can be followed. A number four door would appear as shown in Figure 7. The parts of a number eight door are easily identified by the markings as shown in Figure 8.

When the marked sides are used throughout as working sides, and assembling is done according to this method, the possibility of warp will be greatly reduced.

Members of more complicated structures can be identified in a similar way. For example, the parts of a full-sized door with glass panes in the upper part and a wooden panel in the lower part, would appear roughly as shown in Figure 9. Marked for easy identification, they are placed and marked as shown in Figure 10.

Small tables, consisting of legs and a number of rails, require some way by which each member is easily identified. In their approximate position the individual members would appear as shown in Figure 11. For identification, the legs are grouped and marked as shown in Figure 12. Upper and lower rails are marked accordingly. The legs in the back are marked with 3 horizontal lines and the ones to the left with 4 lines. The four sets of rails are marked as indicated in Figure 12.

More complicated tables and desks can be made by following this basic marking system. In laying out the members for a kneehole desk, it might be advisable to mark the left and the right units separately. If the left unit contains a number of small drawers, and the right unit is made to hold a writing tablet and two large drawers, the drawer fronts and writing tablet can be identified as shown in Figure 13.

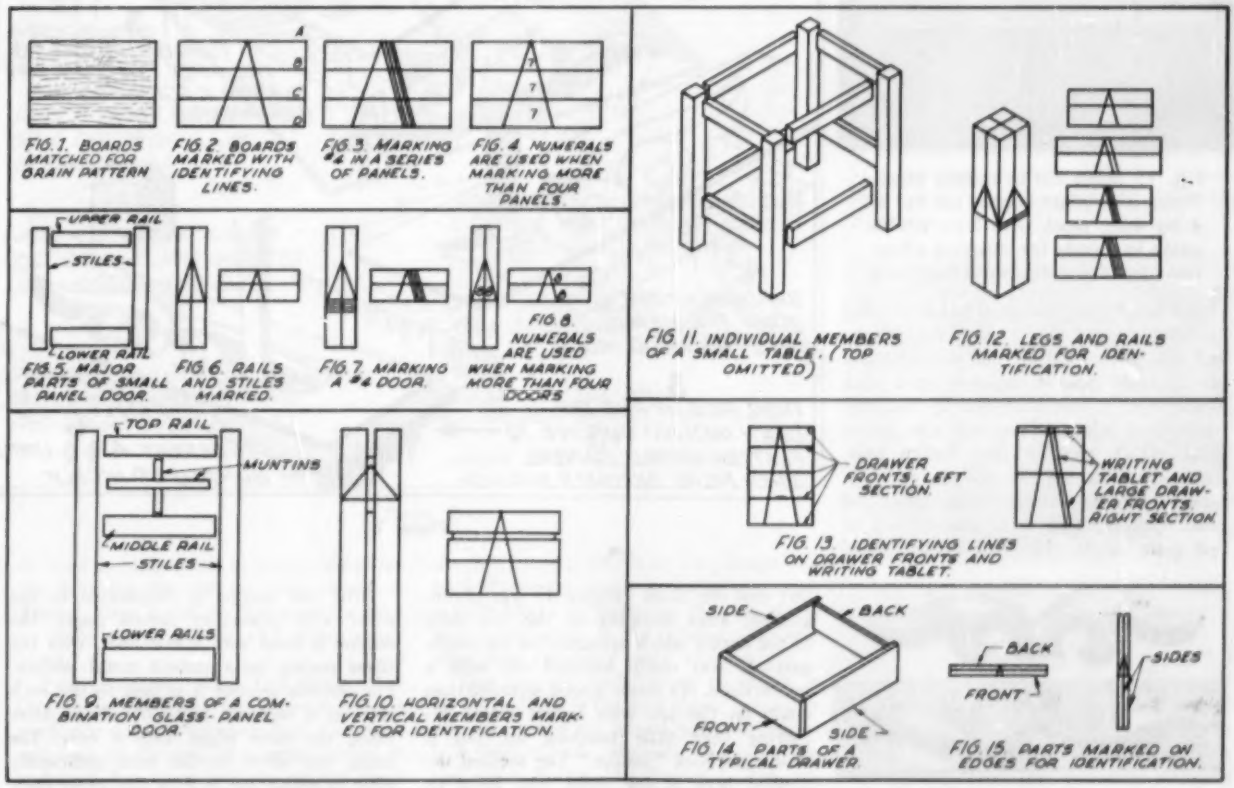


FIG. 1. BOARDS MATCHED FOR GRAIN PATTERN
FIG. 2. BOARDS MARKED WITH IDENTIFYING LINES.
FIG. 3. MARKING #4 IN A SERIES OF PANELS.
FIG. 4. NUMERALS ARE USED WHEN MARKING MORE THAN FOUR PANELS.
FIG. 5. MAJOR PARTS OF SMALL PANEL DOOR.
FIG. 6. RAILS AND STILES MARKED.
FIG. 7. MARKING A #4 DOOR.
FIG. 8. NUMERALS ARE USED WHEN MARKING MORE THAN FOUR DOORS
FIG. 9. MEMBERS OF A COMBINATION GLASS-PANEL DOOR.
FIG. 10. HORIZONTAL AND VERTICAL MEMBERS MARKED FOR IDENTIFICATION.
FIG. 11. INDIVIDUAL MEMBERS OF A SMALL TABLE. (TOP OMITTED)
FIG. 12. LEGS AND RAILS MARKED FOR IDENTIFICATION.
FIG. 13. IDENTIFYING LINES ON DRAWER FRONTS AND WRITING TABLET.
FIG. 14. PARTS OF A TYPICAL DRAWER.
FIG. 15. PARTS MARKED ON EDGES FOR IDENTIFICATION.

Identifying parts within a woodworking project by William F. Holtrop

The individual members of each drawer appear in Figure 14. Marked for identification, they appear in Figure 15.

The method described here undoubtedly has its limitations. But it is simple and effective.

INDIAN SILVERSMITHING

BEN HUNT
Hales Corners, Wis.

Square Dance Belt Buckle

I have always admired Indian cast silver but have never been too successful in casting. Casting requires molds and a good forge and for the average silver worker a good forge is a luxury that is too expensive.

Some time ago we published an imitation cast bracelet, made by shaping and soldering triangular wire. However, when heavier pieces are wanted this method will not do so well.

Fig. 1. Mold cut in maple block. These end-grain blocks cut out of 4 by 4-in. stock into 3-in. pieces come in handy for shaping silver. Note mold for diamond bump-up

The belt buckle described herewith looks for all the world like a good cast bracelet and it is not as heavy. You will probably say it can be done in repoussé, on a pitch block. Yes, it can, but not in 18-gauge silver. And thinner silver will not permit filing, which gives it that Indian look. Using a wooden mold as was done here is a better way of shaping heavier silver and much quicker. This mold was cut out of end grain maple (birch or walnut would do) and the block (Figure 1) was photographed after bumping up the two sides of the buckle which accounts for its roughness. It was really whittled out with a pocketknife. No doubt a good repoussé man could do the job with lighter metal, requiring very little touching up, but it would not look "Indian." The method described here is for those who have no forge or pitch block.

Fig. 2. Showing one side sawed out

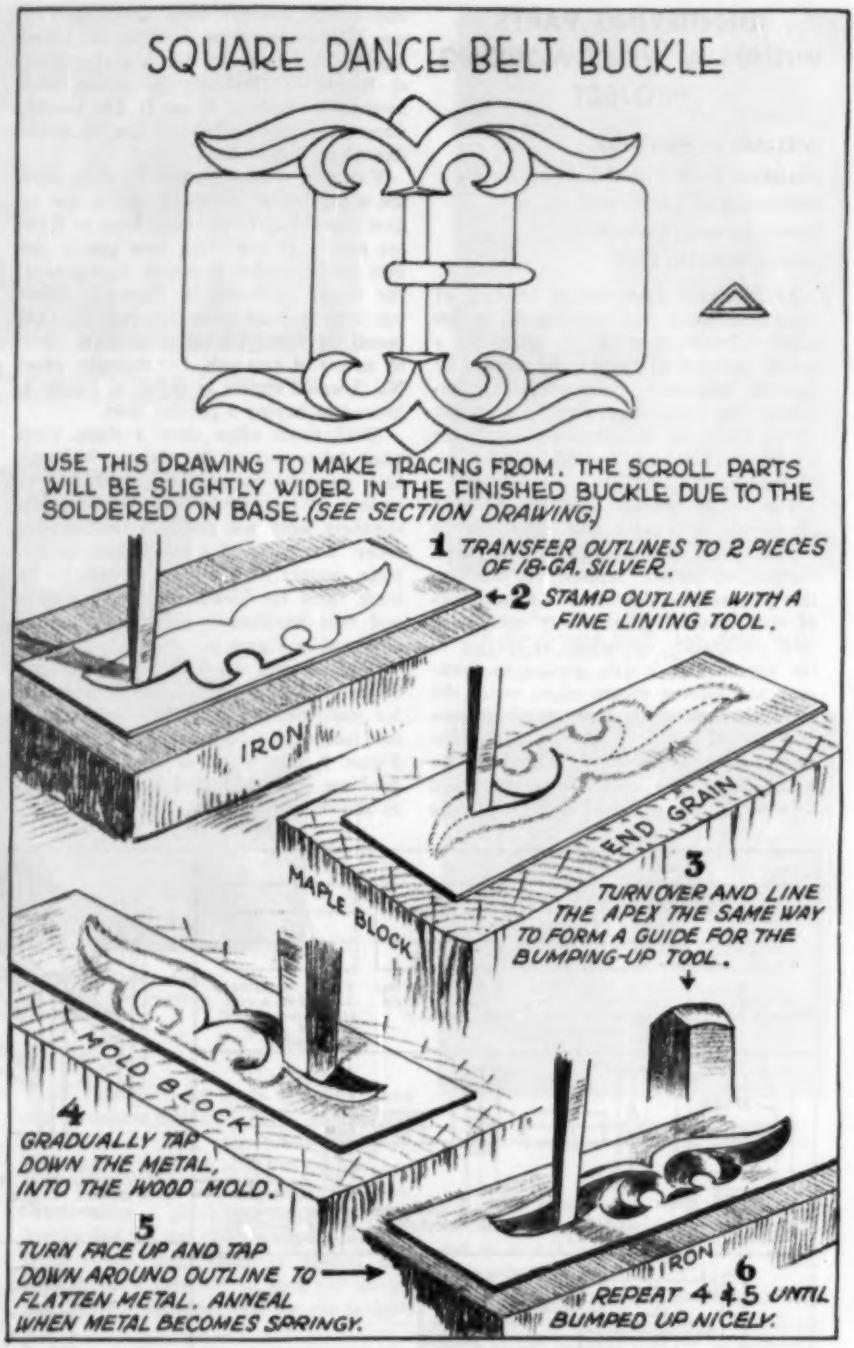

SQUARE DANCE BELT BUCKLE
USE THIS DRAWING TO MAKE TRACING FROM. THE SCROLL PARTS WILL BE SLIGHTLY WIDER IN THE FINISHED BUCKLE DUE TO THE SOLDERED ON BASE. (SEE SECTION DRAWING)
1 TRANSFER OUTLINES TO 2 PIECES OF 18-GA. SILVER.
2 STAMP OUTLINE WITH A FINE LINING TOOL.
IRON
END GRAIN
MAPLE BLOCK
3 TURN OVER AND LINE THE APEX THE SAME WAY TO FORM A GUIDE FOR THE BUMPING-UP TOOL.
MOLD BLOCK
4 GRADUALLY TAP DOWN THE METAL, INTO THE WOOD MOLD.
5 TURN FACE UP AND TAP DOWN AROUND OUTLINE TO FLATTEN METAL. ANNEAL WHEN METAL BECOMES SPRINGY.
IRON
6 REPEAT 4 & 5 UNTIL BUMPED UP NICELY.

Plate 1

After the outline is transferred to the silver with typewriter carbon paper, the outline is lined with a fine liner, with the silver resting on a smooth metal surface. For obvious reasons it is best to put each side on a separate piece of silver. After lining the outer edges, turn it over. The lining will show on the back sufficiently plain to enable one to draw the center lines, for the apex. This apex line is hammered

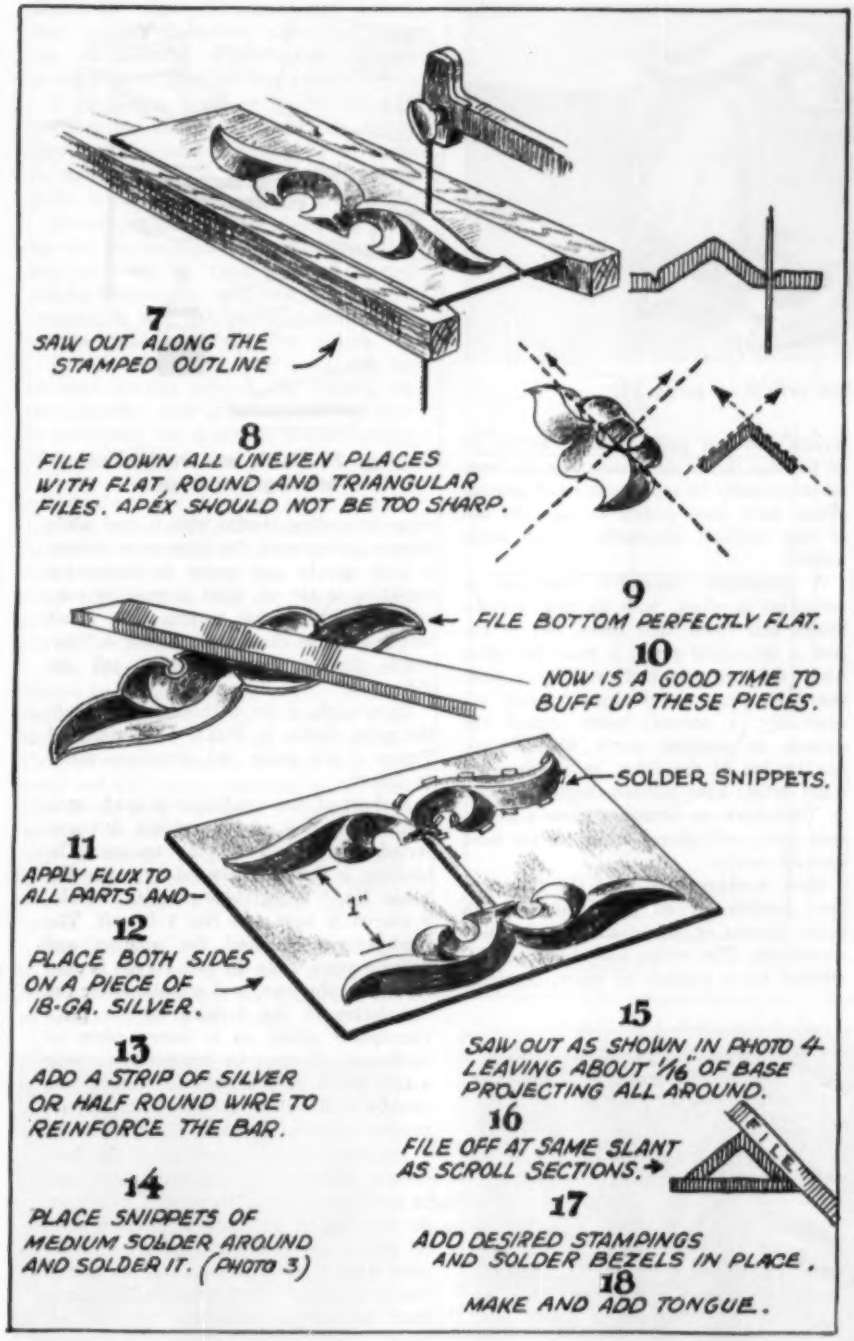

7
SAW OUT ALONG THE STAMPED OUTLINE
8
FILE DOWN ALL UNEVEN PLACES WITH FLAT, ROUND AND TRIANGULAR FILES. APEX SHOULD NOT BE TOO SHARP.
9
FILE BOTTOM PERFECTLY FLAT.
10
NOW IS A GOOD TIME TO BUFF UP THESE PIECES.
SOLDER SNIPPETS.
11
APPLY FLUX TO ALL PARTS AND—
12
PLACE BOTH SIDES ON A PIECE OF 18-GA. SILVER.
1"
13
ADD A STRIP OF SILVER OR HALF ROUND WIRE TO REINFORCE THE BAR.
14
PLACE SNIPPETS OF MEDIUM SOLDER AROUND AND SOLDER IT. (PHOTO 3)
15
SAW OUT AS SHOWN IN PHOTO 4 LEAVING ABOUT 1/16" OF BASE PROJECTING ALL AROUND.
16
FILE OFF AT SAME SLANT AS SCROLL SECTIONS.
FILE
17
ADD DESIRED STAMPINGS AND SOLDER BEZELS IN PLACE.
18
MAKE AND ADD TONGUE.

Plate 2

or lined from the back to form a guide for the bumping up tool or iron, shown in Plate 1, steps 3 and 4. This apex line may be done on a smooth end grain maple block.

Now place one piece, face down, over the maple mold and tap it down into it gradually with the bump-up tool. The piece will lose its flatness, of course. Anneal it and lay it face down upon the smooth metal surface and tap all around the outline with the lining tool to flatten it. This is repeated until the proper shape is reached. It takes a little longer to bump up the two pieces than to tell about it, but it takes much less time than the pitch block method.

Now saw out both pieces, as shown in step 7 in Plate 2. Figure 2 shows one ready for sawing and one sawed out. The reader will probably ask, why not just bump up the entire buckle like Figure 3. The answer to that is, that it would be rather

Fig. 3. Sides and bar re-enforcement soldered to base

difficult to file out irregularities on the bump-ups.

After sawing out the two pieces, file them where filing is required and buff them, as it is much simpler at this stage. Place them in position on a piece of 18-gauge silver as shown in Figure 3, and solder them down.

From here on it is rather easy. Simply saw out as shown in Figure 4. In doing this sawing, do not saw right up to the bump-up. Stay away about 1/32 in., to allow for a continuation of the angle of the bump-up when it is being filed. Figure 3 was photographed after it was filed.

Now for the stamping of the small ornamentations and the bezels. This might vary, depending of course on the shape of the stones you have on hand. Square, oblong, round, or oval stones would look equally well, perhaps even better. I just happened to have these two stones on hand. The tongue is put on last. This may be of 14-gauge silver or 10-gauge round wire.

Of course, this buckle may be made to fit a narrower or wider belt, but a one-inch belt is rather standard and obtainable anywhere.

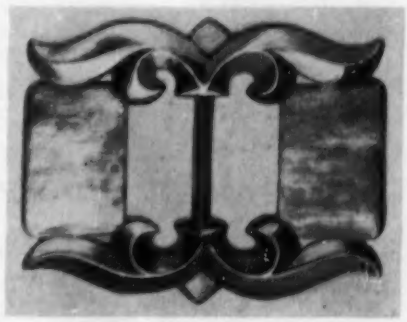


Fig. 4. Buckle sawed out and filed ready for stamping ornamentations and bezels. See Fig. 5, p. 24

Another state, South Dakota, is the newest addition to the list of oil-producing states in this country, bringing the total to 28.—*Petroleum Newsnotes.*

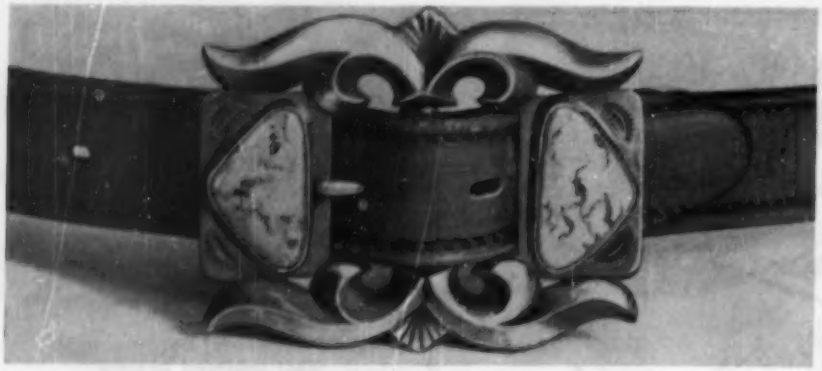


Fig. 5. Finished buckle (See article on page 22)

HOW TO MONOTYPE WITH LITHOGRAPHIC CRAYONS

WILLIAM S. RICE
Oakland, Calif.

What do you mean by a monotype? is a question usually asked when the subject happens to be mentioned. According to the encyclopedia, it is a "unique print, which is an emotional effect, as the plate has really not been engraved at all and only one print can be made. The subject is drawn or painted upon a metal plate and printed by a press, or by hand, rubbing it off with a bone, or ivory paper folder."

The word monotype means literally one print and in reality only one print (though sometimes a second may be obtained from the one drawing or painting made on the plate). Monotypes are sometimes slightingly spoken of as an artist's pastime and are therefore regarded as a none too serious form of printmaking. Pastime or no pastime, the art of monotyping has been taken seriously by some artists and unusual effects have been gotten through the use of this medium obtainable by no other method.

A monotype somewhat resembles a mezzotint in effect, with its rich, velvety blacks and subtle half tones, but to ensure a successful print, it must be taken while the paint is still wet. Since only one print, may be obtained (though occasionally, a second) some regard the process as scarcely worth while except for the fun of the thing. In recent years many artists have amused themselves with it. They have on occasions given a monotype party, and offered prizes for the most unusual results.

Most workers have used the time-honored medium of oil paint thinned with either linseed or poppy oil to make their monotypes. The writer has also used this method for a number of years, obtaining some interesting results with it, and while experimenting with the monotype process a year ago he ran across an interesting variation of the oil paint process by substituting lithographic crayon. The result was a print so closely resembling a lithograph that it was difficult to tell the difference.

Fig. 2. Tools and method of making monotypes

Here briefly is the method used to obtain the print shown in Figure 1. A study of Figure 2 will make the directions easier to follow.

A sheet of fine sandpaper is used, upon which a tracing of the subject is transferred by rubbing on the tracing. The drawing is then commenced by using No. 1 and No. 5 lithographic pencils. The No. 5 crayon is hard and No. 1 is soft. The hard crayon is used for outlines and delicate grays while the soft crayon is used for darks, shadows, and accents. After the completion of the drawing on the plate (sandpaper glued on a heavy piece of cardboard) it must be brushed over with a soft brush or a feather to remove free crumbs of the crayon, which if left, would produce unsightly, round, black spots.

Japanese Hosho paper gives the best results, although any absorbent paper may be used successfully. To prepare the paper, do not soak it in water as is done when oil paints are used but rub it evenly all over with a piece of soft rag or cotton that is saturated with turpentine. The paper must be evenly saturated but not too moist. Here experience must be the determining factor. If you have an etching press handy so much the better, but if not, a clothes wringer will produce excellent results when it is screwed down as much as possible.

The prints are made in the press in a manner similar to that used in making an etching. First a blotter or clean sheet of paper is laid on the press bed (which may be a sheet of tin or heavy pasteboard and folded in the middle like a book cover). The plate (sandpaper) is laid on this, drawing side up. Upon this is

Fig. 1. Lithograph crayon monotype

placed the paper dampened with turpentine, a sheet of blotting paper and lastly the felt blanket. Considerable pressure is required to give the best results.

Perhaps the beginner would do well to have his monotypes small; the larger they are the more difficulty he is likely to encounter in the printing, particularly if he is dependent upon a wringer press.

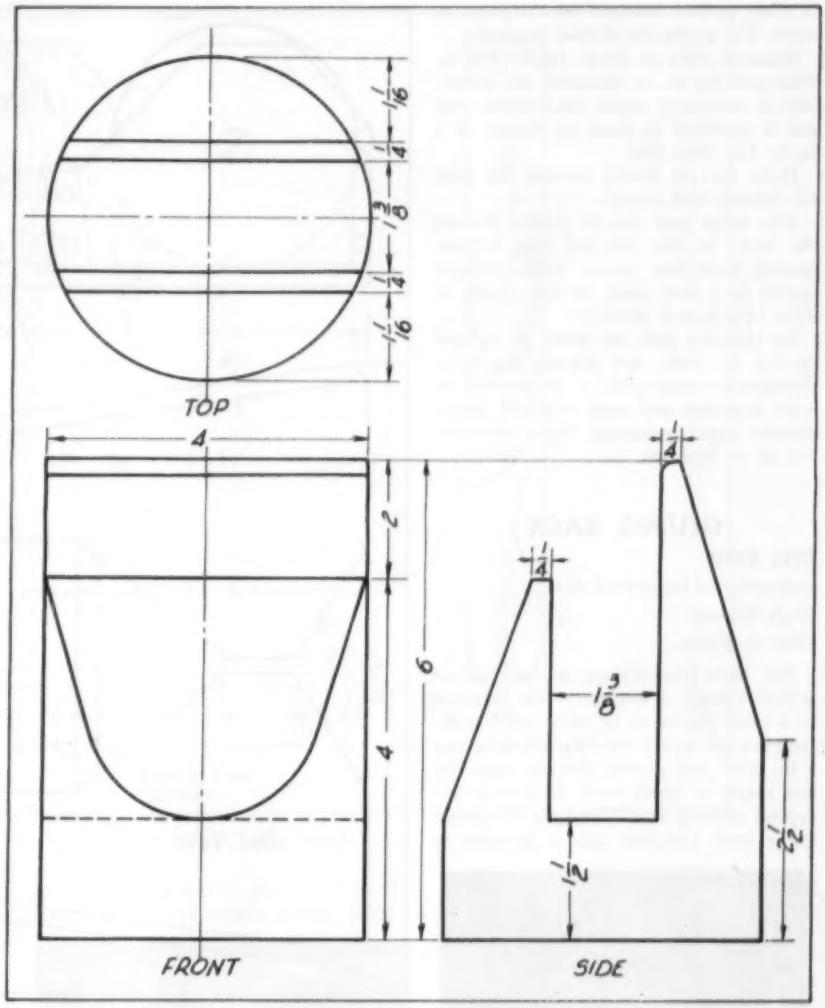
Monotypes made by the foregoing process do not smudge, since the turpentine acts as a fixative. Once you get started making monotypes with the lithographic crayons, it will not be long before you become enthusiastic with this process.

Though usually only one print may be obtained by this process, the drawing on the sandpaper plate is not injured and may be preserved; but it cannot be successfully used again for printing.

When the student has experimented sufficiently to obtain a fine print, he may frame it with a matt and a narrow molding, backed with a cheaper material like tagboard. Gummed paper tape serves as a hinge for the matt, also for "tipping" the print to the inside of the matt, which is always kid finished white Bristol board.

The opening cut in the matt should always be larger than the monotype print leaving about ¼-in. space at top and sides and a wider space, say ½ in. at the bottom. Cut the matt so that its top and sides are equal and the bottom somewhat wider. The title of the print and artist's signature are written in pencil just below the lower edge of the print itself. A good molding is narrow, half round, finished in natural wood or painted white, black, gray, or brown.

Handmade prints on a wall are a relief to the eye after seeing so many mechanical reproductions, and they add brightness and an artistic touch to any room.



Details of the napkin holder

Rustic paper napkin holder

RUSTIC PAPER NAPKIN HOLDER

FRANK B. BARROWS
Graduate Student, Industrial Arts
San Francisco State College
San Francisco, Calif.

This napkin holder makes use of limbs or small trunks of redwood or cedar. It is easily cut out on a band saw. It is wise to first peel off the loose bark and then dip the piece in a mixture of half kerosene and half paint thinner to kill all larvae in the bark. A thick clear lacquer, heated to reduce the viscosity, gives the best gloss finish.

MEMO PAD

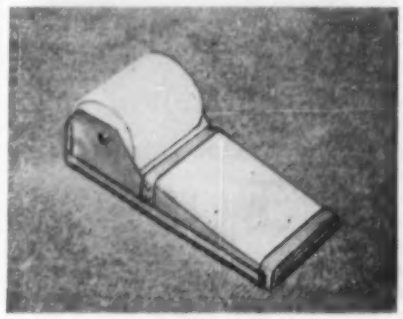
J. W. BOLLINGER
Tulsa, Okla.

The memo pad described herewith is made of IX tin plate, .032 aluminum, or No. 20-ga. sheet copper or sheet brass.

Lay out the body of the memo pad as shown in the pattern drawing. Bend the hems. Make the bends to bring the body into shape.

The end of the scratch pad is a separate piece, riveted in place.

The two guides for holding the paper in line are ½ in. wide, and are raised up from the writing surface of the pad about ⅛ in.



Memo pad

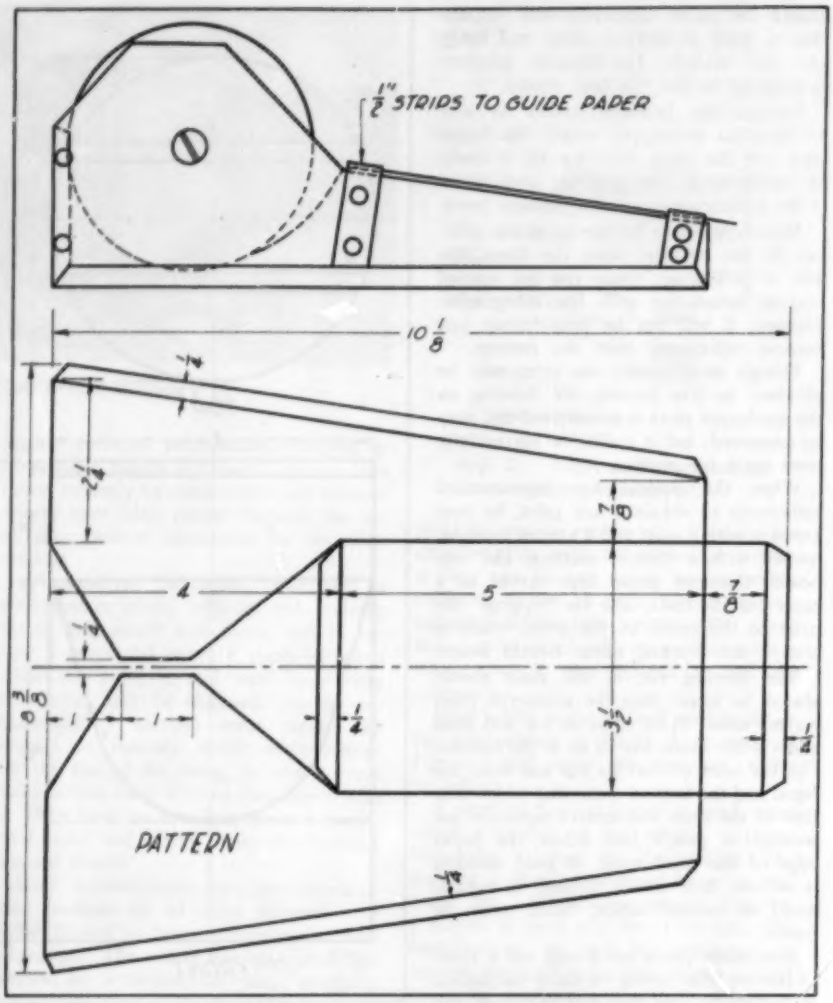
to allow perfect freedom for the paper to move. The guides are riveted in place.

Standard rolls of memo paper, 3⅞ in. wide and 3½ in. in diameter, are obtainable at stationery stores everywhere. The roll is mounted in place by means of a ¼ by 3¾ stove bolt.

Holes may be drilled through the sides for holding lead pencils.

Two holes may also be drilled through the back, so that the pad may be suspended from two square hooks suitably spaced on a door jamb, window frame, or other appropriate place.

By changing only the width of the pad to 2½ in. wide, and leaving the other dimensions unchanged, it is possible to make a smaller pad using standard adding machine paper, measuring 2⅜ in. wide and 3½ in. in diameter.



Details of the memo pad by J. W. Bollinger

GLUING RACK

DELL REED
Instructor of Industrial Arts
High School
Liberal, Kans.

For more convenience in the use of cabinet clamps, a stationary rack attached to a table proves to be very satisfactory. Grooves cut in a 2 by 2-in. board spaced 2 in. apart will provide holding space for any length or width stock. Groove widths depend entirely upon the type of clamps to be used. Grooved rack is attached to table with bolts at desired spaces, depending upon the length of the table. The rack must be set high enough off the table by the use of 2-in. stock to permit easy adjusting of clamps.

Gluing rack

HAND CARVED TABLE LAMP

F. M. CLEMONS
Churchland High School
Portsmouth, Va.

Occasionally the industrial-arts instructor has a student who would like to do something different from the general run of projects. The usual tie racks, book ends, lamps, and magazine holders, in their more familiar shapes, have no appeal to some students unless they can be designed differently.

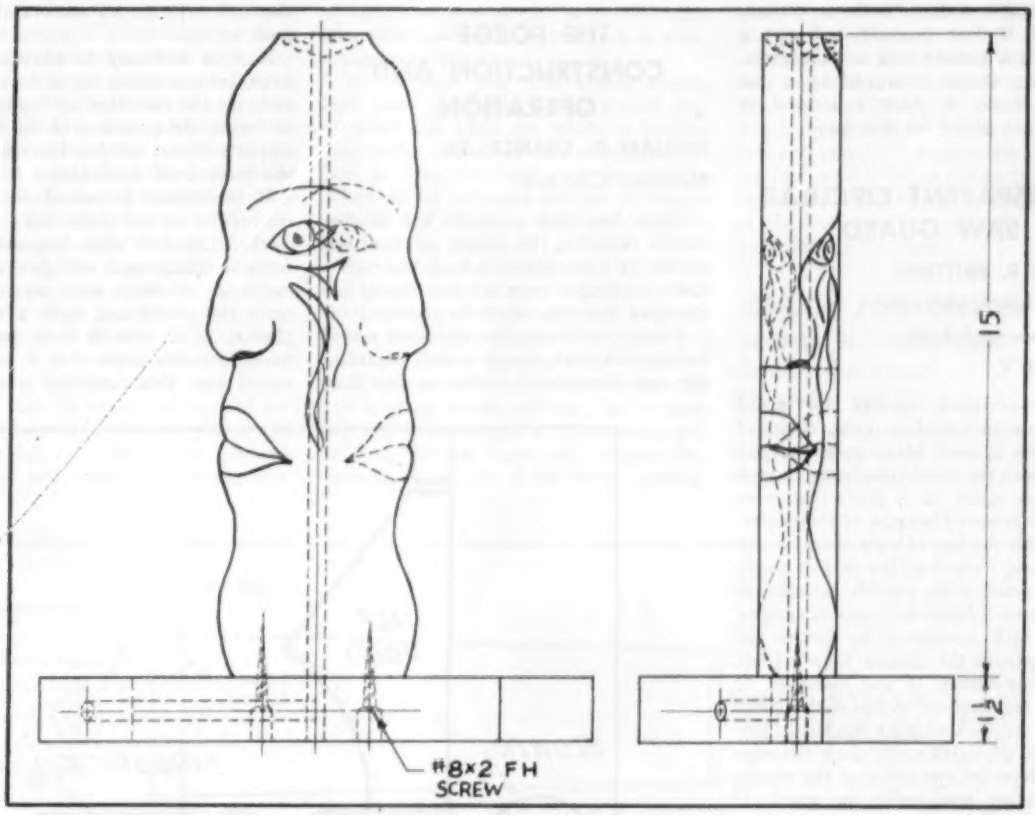
With a little imagination and experimentation, the most common project can be treated uncommonly well. Sometimes a bit of carving on a project will do the trick.

However, wood carving, as such, in the classroom appears at first too complicated for the average student; yet, when a minimum of tools and operations are used, it is quite simple. The hand carved table or desk lamp, shown in the accompanying illustrations, is simple enough for the average student, especially if the face is not duplicated. (The face is duplicated on the lamp shown but would be just as effective without the duplication.)

The lamp stock and base are made of 2 by 6 by 15-in., and 1½ by 5½ by 9½-in. oak, respectively.

Procedure

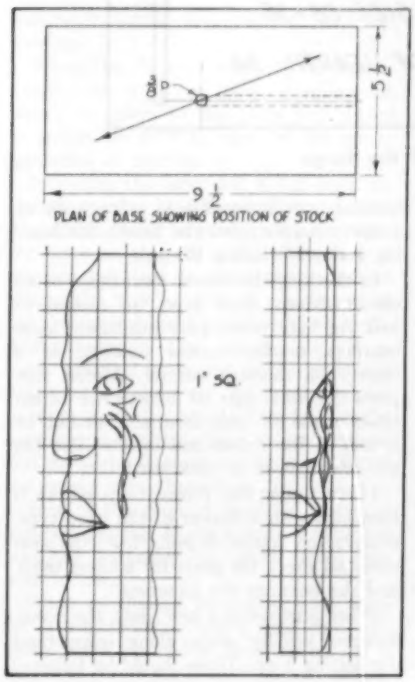
Select stock and square to the dimensions given. Lay out hole for threaded pipe and drill as shown in both pieces of stock. If an extension bit is not on hand, it will be necessary to drill the stock from both ends and finish boring with a small



Hand carved table lamp

auger bit. Then lay out face silhouettes and saw with band saw.

Clamp or fasten stock to bench top so that one side may be worked with freedom. Sketch nose and eye areas on the wood. Begin cuts with a gouge, using a mallet to drive it whenever necessary, working out hollows and bulges of areas. Alternately, use wood rasp and gouge until general shape is obtained. Next, shape the mouth and chin. Do not attempt to form lips until mouth shape has been worked out. Round out chin and forehead. Then work entire area for refinement of shape. Repeat procedure for alternate side if desired. Sand with No. 1/2 garnet paper. Repeat sanding with 2/0 paper.



Hand carved table lamp

Lay out eyes and other features. Carve in details with carving knife. Finish sanding with 5/0 garnet paper.

Attach base with glue and two No. 8 2-in. flat head screws.

Screw a short piece of ⅜-in. threaded pipe into the lamp top. Attach fixture. This will enable the student to hold lamp while applying the finish.

Finishing Lamp

The lamp shown was finished as follows:

A coat of black enamel, thinned slightly with turpentine, should be brushed on. Make sure the entire surface is covered but try not to fill grain with enamel. Allow enamel to dry thoroughly and fill grain with white filler. If filler is made up in the shop, use white titanium because many pigments color or fade. Let filler dry at least 24 hours. Rub lightly with fine steel wool, brush surface clean, and seal

with a suitable sealer. Finish as desired. The finish, if done properly, will give a brilliant black surface with a white grain.

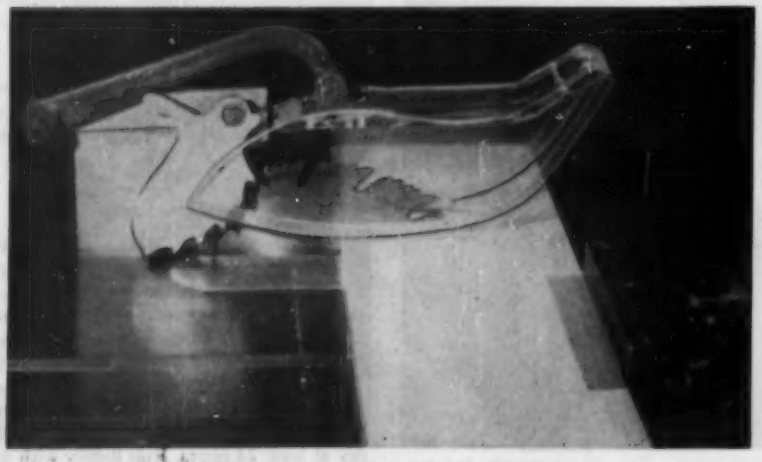
The lamp shown is topped by a red Fiberglas shade. A shade cylindrical in shape is best suited for this lamp.

TRANSPARENT CIRCULAR SAW GUARD

CHARLES R. BRITTING
Industrial Arts Instructor
Holley Central School
Holley, N. Y.

The conventional circular saw guard often seems to create as great a hazard as it guards against. Many operators prefer to remove the guard completely because it obstructs vision. It is likely that more guards are removed because of their interference with the line of sight than for any other reason. Failure on the part of pupils to use a guard when possible is sufficient to void some liability insurance coverages. There is little temptation to remove the guard shown in the picture since it does not obstruct vision. It was fashioned to duplicate the size and shape of the guard originally supplied with the machine. Fluorescent red Plexiglas strips along the edge serve to draw the eye and alert the worker to the danger area under the guard. If the saw blade should accidentally contact the guard, damage will be minimized due to the lack of metal to metal contact. The original model has served well for several years. It deflects flying particles and acts as a visual and contact reminder. Although no guard is foolproof, this one is a definite improvement over the traditional type. See illustration below.

Educational television can push back the walls of the classroom and make learning more interesting. — *Dr. Baker, General Electric Company.*



Transparent circular saw guard

THE FORGE— CONSTRUCTION AND OPERATION

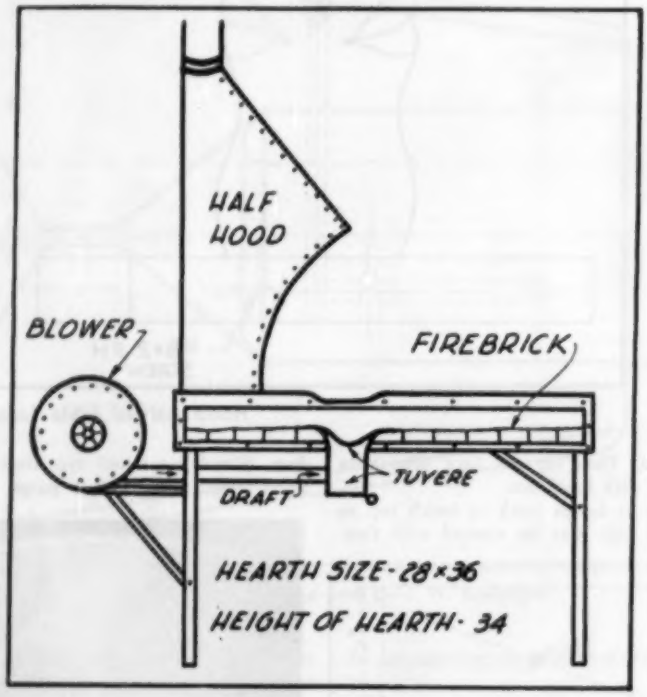
WILLIAM D. CRANCE, SR.
Michigan City, Ind.

There has been a good deal of discussion regarding the proper care and operation of a blacksmith's forge and sometimes a willing listener is led astray by the improper direction which he receives.

The forges of today are of unique manufacture and much can be written regarding the care they are to receive so that they may give a maximum number of years of good service.

If it is necessary to purchase a used forge, several points are to be considered, such as: the condition of the tuyere iron or firepot, the condition of the hearth and supports (legs), and last but not least, the blower or draft mechanism.

If the tuyere is burned out or badly cracked, it is of little use; besides a cracked tuyere is very dangerous because damp smithing coal will give off inflammable gases which may accumulate beneath the hearth and cause a violent explosion. It is wise to look beneath the hearth to determine if it is cracked or rusted out. This condition is undesirable because it is impossible to place work of a heavy nature upon the hearth for heating without breaking through.



Drawing of the forge

In checking the blower mechanism of an electric-driven draft type, be careful to look for bare wires, poor insulation, loose bearings, cracked motor housing, or a burnt out rheostat control. Motor supports for this type of blower are oftentimes made of cast iron and should be looked at for cracks and breaks. The fan and case should be considered also.

If the forge you intend to purchase is furnished with a blower of the hand type, remove the screws or bolts from the gear case and check the gears for missing teeth, and the bearings for looseness.

When purchasing a new forge, the manufacturer usually sends along instructions for setting it up. These should be followed

closely. If the tuyere or firepot is made part of the hearth it is advisable to use a good grade of firebricks. These bricks can be purchased from a hardware or industrial supply house. The brick should cover the entire hearth up to and surrounding the tuyere. It is necessary to bind the bricks in place with a mortar of fine grained fire cement which can be purchased along with the bricks. Full-size brick is often too heavy to use and split brick is too thin. Three-quarter brick is generally used to best advantage. Many smiths use clay which is dug from a deposit they may know of and claim that it holds up well. The author is inclined to disagree with this practice. His experience has shown him that a high degree of heat applied for a long time may make the clay plastic and cause it to run into the tuyere, covering the opening and causing a clinker, also making it almost impossible to do forge welding.

When the forge is ready to be permanently placed in a shop, consideration should be given to the place best suited to enable the draft to carry off the smoke and gases of the fire.

Providing the forge has a half-hood attached to the hearth, as shown in the illustration, it is a good policy to place the forge as near the wall of the shop as possible but keep in mind the danger of setting the wall on fire. If you intend to use the forge in conjunction with an anvil, power hammer, tire bender, etc., it is more practical to locate the forge in the center of the shop and the hood two feet or more above the hearth. This hood is the same shape as a very large inverted funnel and should be fastened to the lower end of the smoke pipe, braced to the ceiling or rafters of the shop. A hood of this type makes it possible to place work in different positions according to which tools you wish to use.

When purchasing blacksmith coal, look for a bright luster and a coal that will easily break up in the hand by hitting a couple of pieces together. Coal with yellow streaks of sulphur should be avoided; also coal with any foreign matter such as slate, manganese, dirt, etc.

If you have just built a new hearth, light some paper and put on a good deal of wood and when the whole is burning vigorously, spread out the wood and embers to bake the brick and fire cement. When the fire is burned out and the hearth is hard and dry, you are then ready to build a forge fire.

Place some coal in the coal box or on the hearth and dampen with water. Put wood shavings or an oily rag into the tuyere, then light. Turn on the blast and when the fire is burning bright, place a small amount of coal in the tuyere. At first a heavy smoke will rise, but in time this will disappear and a yellow flame will be seen. Put on more coal, making two cones on either side of the tuyere opening. Continue the draft until two mounds of coke are formed and there are plenty of red coals in the tuyere. Do not shut off the blast of air at first because the green coal gives off gases, which will explode when the blast is turned on again.

For heating stock to make chisels or work of similar nature, requiring a short heat, it is best to keep a small fire which saves coal. Of course, it is sometimes necessary to build a rather large fire, but this should only be done when necessary, such as in heating a heavy forging, where it is required that a large section be worked in one heat.

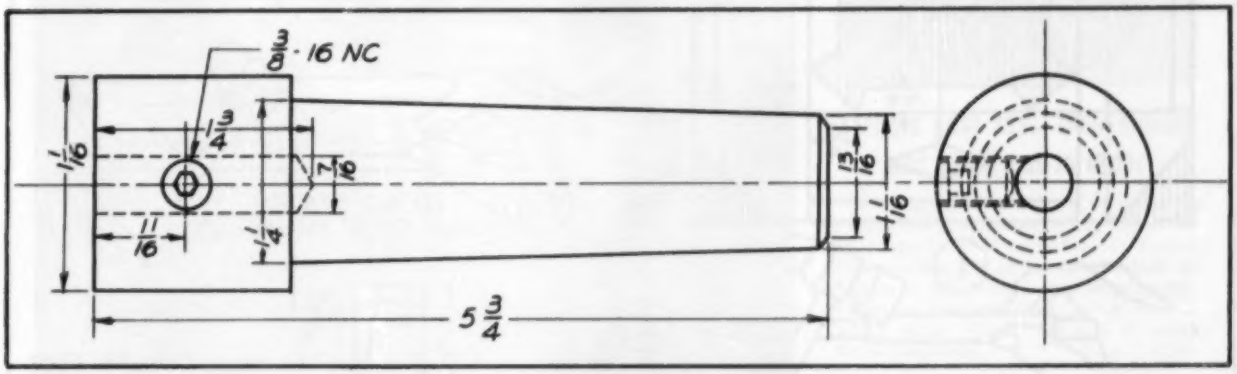
Quite often it is necessary to bank the fire for some time and a good way of doing this is to put a block of wood in the fire and keep placing coal around it. The above method will usually keep a fire going for from two to five hours. When through with the fire, it should be thoroughly cleaned, all the good coke and coal separated and saved, and the ashes and dirt removed, to be disposed of. The forge is then ready for future use. Coke should be saved for when lighting the fire again it will catch on fire more quickly than green coal and a good deal less smoke is given off.

It should be remembered that there are four essential tools used with the forge. They are as follows: (1) a fire shovel for handling coal; (2) a slicer for breaking up coal and coke; (3) a poker for manipulating fire control; (4) a dipper for dampening the coal and to aid in the prevention of the fire from spreading by sprinkling water around its edges.

CHUCK FOR CENTER DRILL

GEORGE W. DEFFENDAHL
Central High School
Evansville, Ind.

It has been a difficult problem to keep the 130 boys that are enrolled in my metal shop classes each semester from breaking center drills. We have reduced this breakage to a very minimum by using the chuck, shown in the accompanying illustration, in the head of lathes.



Details of the chuck to be used in the head of lathes

The procedure we use is to locate the center of the stock by using the center head, or the hermaphrodite calipers method. Then we center punch each end of the stock. With the hand we hold one end of the stock against the tailstock center and drill each end to the correct depth.

ROLLED EDGE TIN PHOTOGRAPH FRAME

ENID BELL
North Bergen, N. J.

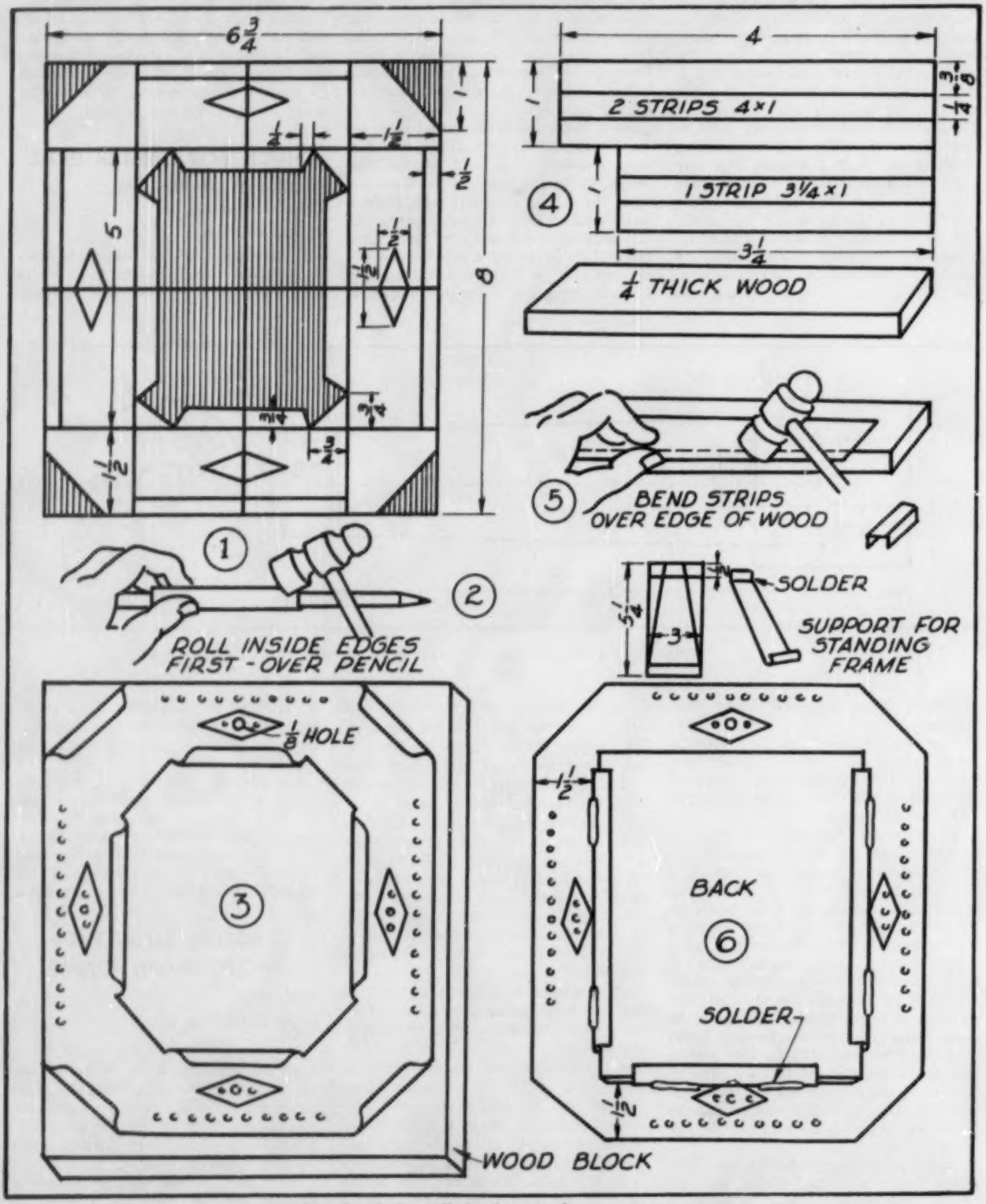
The rolled edges of the frame for a 4 by 5-in. photo or print are both functional and decorative as they serve to counteract the flexibility of the metal and contrast effectively with the flat areas. The roll is easily formed over a round pencil or short length of dowel.

An 8 by 10-in. size, suitable for mirror or print may be made by doubling all measurements.

Slot strips soldered to the back provide for the insertion and securing of glass, picture, and cardboard or tin backing. Bend these strips over a piece of ¼-in. thick wood held stationary with clamp or nails.

The tin backing is needed only for a standing frame as the support must be soldered to it at the requisite angle. Otherwise the frame may be hung on a headless nail through the hole provided in the center of the top triangular motif.

(Continued on page 18A)



Details of the rolled edge tin frame process

ATF Good School News

GRAPHIC ARTS—THE EDUCATIONAL FIELD WITH A FUTURE

American Type Founders, Educational Services Department, 200 Elmora Avenue, Elizabeth, New Jersey

West Senior High School students meet their new Little Giant 6.

Little Giant expands program of Graphic Arts in Illinois High School

Platen presses once served industry and schools as the basic press for teaching presswork but today, with the predominance of the small automatic cylinders over platens in industry, students should be taught on the small cylinder press.

George Brock, Principal of West Senior High School, Aurora, Illinois, backed up his conviction on this phase of Graphic Arts Education when he installed a new ATF Little Giant 6 in his high school. The basis for Mr. Brock's decision was that the Little Giant operates on the same horizontal principle as all other larger sheet-fed presses actually used in industry.

Composing room equipment rounds out graphic arts program.

That's why the graphic arts training and experience West Senior High School students are getting is a real introduction to modern techniques in printing. In addition to their ATF Little Giant, the Aurora installation includes a power-driven platen, silk screen, composing room, and bookbinding equipment to round out the graphic arts program.

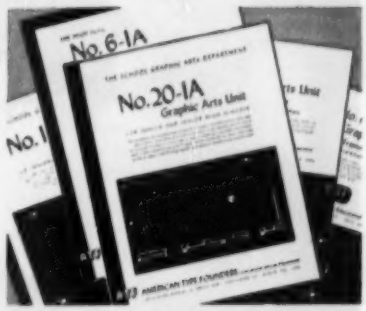
Further information on letterpress, offset or other equipment for your industrial arts program is available from ATF's Educational Services Department. Please include your name, position and school when writing.

New Troyer Zodions

2 fonts cost less than making one small cut to order

Here are two new fonts of versatile decorative spots, designed by the artist who introduced the now famous Troyer Ornaments. By no means limited to "signs of the Zodiac," they liven up monotonous jobs, especially when used to add a touch of color. 36 and 48 point fonts available.

New graphic arts specification folders available



Seven new ATF folders give layouts plus material and equipment requirements of various sized graphic arts classes for junior, senior or vocational high schools, trade schools and colleges.

Plans designed by ATF's engineering service allow for maximum number of work stations in any given area. ¼" scale drawings are available on request.

Material and equipment requirements are broken down by booklet to accommodate classes of 3 to 5, 6 to 10, 15 to 20, and 20 to 24 students in the various school levels.

Write ATF's Educational Services Department for these helpful folders.

ASSOCIATION NEWS

(Continued from page 6A)

ington, industrial-arts instructor, Ames Junior High School, St. Paul, Minn., and instructor, industrial education, University of Minnesota, Minneapolis, Minn.; vice-president — Malcolm W. Doane, industrial-arts instructor, Central Junior High School, St. Cloud, Minn.; secretary-treasurer — Frederic H. Rowell, head, industrial-arts department, Richfield High School, Minneapolis 23, Minn.

WISCONSIN INDUSTRIAL-ARTS MEETING

The Wisconsin Industrial Arts Association held its annual meeting Thursday afternoon, November 4, 1954.

The main speaker on this occasion was Dr. Gerald Baysinger.

He complimented the association for its efforts that have put their state in the forefront of curriculum building and of spreading the teaching of industrial-arts courses.

He pointed out that in order that more teachers be helped, small groups must be formed to discuss common problems. All must join local, state, and national associations so that all can work on solving the problems which confront the industrial-arts field.

He also called attention to the fact that industrial arts is spreading into the lower grades and that we as industrial-arts teachers must help improve and spread this movement.

The following officers were elected for 1954–55: president, Fred S. Darling, Beloit, Wis.; vice-president, W. C. Bohnsack, Milwaukee; secretary-treasurer, Leo R. Ebben, Kohler; committeeman, Jess Krenz, Superior; past president, L. E. Jenkins, La Crosse.

At the E.P.T. breakfast Friday morning, approximately 45 members attended.

MILWAUKEE INDUSTRIAL ARTS ASSOCIATION

The annual Milwaukee Industrial Arts Association meeting was held on Wednesday, November 3, 1954.

It was very well attended.

John Bullock, industrial relations department, Allis Chalmers Company, gave a splendid address on the interest which industry had in the industrial-arts work of the schools.

EPT INITIATION

Theta Chapter of Epsilon Pi Tau, the international honorary professional fraternity for industrial arts and vocational education, inducted seven new members into the fraternity in a formal initiation held October 30, at The Stout Institute, Menomonie, Wis.

Members of the initiating team were Edward Treise, Bill Stern, Robert Swanson, Gordon Maves, Jerome Abbott, Richard Sutton, Phillip Ruehl, and Dean M. M. Price.

The new members are Frank Hoffman, Marvin Kufahl, Edward Prahl, John N. L. Smith, Orville Nelson, and Robert Vieths. The other new member, Wayne Pool, is an instructor in the Milwaukee school system, and past president of the Milwaukee Industrial Arts Association.

A banquet was held at the Hotel Marion following the formal initiation. Dean John A. Jarvis welcomed the new members.

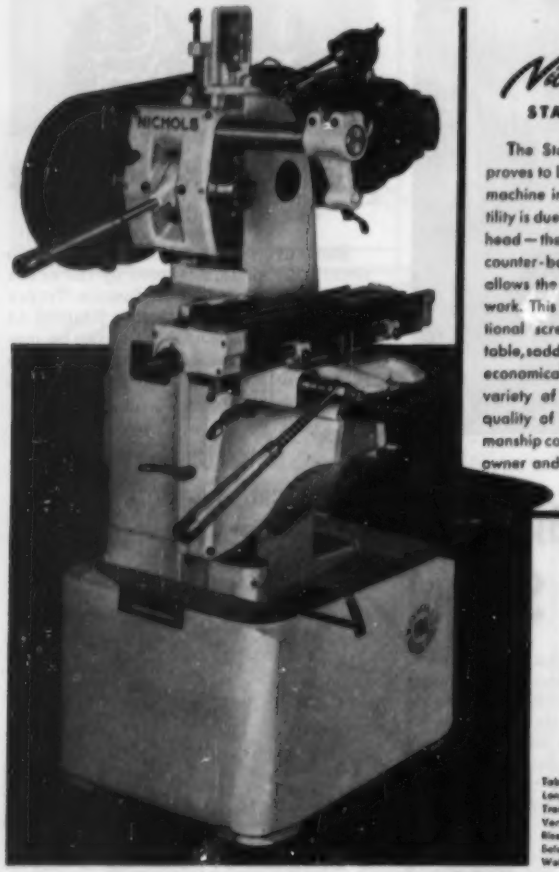
ANNUAL MEETING OF THE NEW MEXICO INDUSTRIAL ARTS ASSN.

The New Mexico Industrial Arts Association held its annual meeting during the state teachers convention in Albuquerque, October 28–29, 1954.

The industrial-arts teachers were invited by the New Mexico Vocational Education Association to hear Mark Nickols, president of the AVA, at their Thursday section meeting.

The program for Friday, October 29, included a report of the AIAA convention by Dr. A. A. Bettina, Eastern New Mexico University, assisted by Chester R. Brown, University of New Mexico, and Lawrence Frederick, New Mexico Western College. A constitution was adopted and the group voted to join the AIAA. Presentation of "pet projects" has become an annual event.

The following officers were named: Dr. A. A. Bettina, Eastern New Mexico University, Portales, president; Chester R. Brown, University of New Mexico, Albuquerque, vice-president; William Forkner, High School, Hobbs, secretary-treasurer; John Foster, High School, Tucumcari, director; Elmer Kuhn, Wilson Junior High School, Albuquerque, director; Lawrence Frederick, New Mexico Western College, Silver City, director.



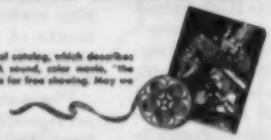
Nichols Miller
STANDARD MODEL

The Standard Nichols Miller often proves to be the handiest (and busiest) machine in the shop. Its unusual versatility is due to the "rise and fall" spindle head — the spindle being mounted in a counter-balanced sliding head which allows the cutter to be brought to the work. This unique feature, plus conventional screw or lever movements of table, saddle and knee, guarantees fast, economical production on the widest variety of parts. And the unexcelled quality of Nichols' design and workmanship commands the respect of every owner and operator.

"the miller that uses its head!"

CONDENSED SPECIFICATIONS

Table Working Surface	48" x 21" or 30"
Longitudinal Travel	32" or 19"
Transverse Travel	7"
Vertical Travel — Knee	13½"
Rise and Fall of Spindle	48"
Selective Speed Ranges up to 3000 R.P.M.	
Weight	1300 lbs.



Write today for the Nichols general catalog, which describes the six models of Nichols Millers. A sound, color movie, "the Miller that Uses its Head" is available for free showing. May we reserve it for you?

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MARCH OF DIMES

JANUARY 3-31

Imagine! Movies in daylight!

You don't have to shut out daylight and fresh air when you show movies . . . or bother with elaborate room-darkening preparations. You *can* use that hard-to-darken classroom for showings. And you *can* leave the lights bright enough for students to take notes during the movie. How? . . .

The projector above—the Kodascope Pageant Sound Projector, Model AV-072—has a *Plus-40 Shutter* that throws *40% more light* than standard shutters. Yet, its superbrilliance costs you not a penny more.

This is just one example of how precisely Pageant Projectors are designed to meet individual projection problems. To overcome sound difficulties in acoustically troublesome rooms, to combine optimum performance with single-case portability, or to give economical all-round performance in both sound and silent showings, Pageant Sound Projector models have true-rated 7- or 15-watt amplifiers, 8- or 12-inch speakers, and standard or *Plus-40* Shutters.

What all Pageants offer you

No matter *which* Pageant you choose, it will be permanently pre-lubricated to eliminate the danger of under- or over-oiling, the major cause of projector breakdowns. A Fidelity Control will permit you to focus the sound-scanning beam to get the most from any optical-sound track, regardless of its position. A built-in field-flattening element will make possible pictures that are needle-sharp over the whole screen area. And your Pageant will *always* be extra-quiet, thanks to nylon gearing, a simplified mechanism, and the wear-reducing effect of pre-lubrication.

Free demonstration

Your Kodak Audio-Visual Dealer will be glad to give you a free demonstration of the Pageant that best solves your 16mm. projection problems. Just mail the coupon for his name and address.

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It's completely new! And it has the *smoothest, surest, fastest* film-advance ever designed!

For *brighter, sharper* pictures, it has the Kodak Ektanon Projection Lens (f/3.5 or f/2.8), 500-watt lamp, Lumenized lens-and-condenser system, and aluminized glass reflector. Shows 2 x 2 slides as well as filmstrips.

Only $98 with f/3.5 lens. (Price subject to change without notice.)

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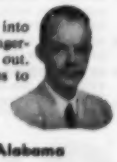
"We profit more in the long run when we can save our customers money. So no wonder we're enthusiastic about Pageant pre-lubrication. It helps eliminate costly repair bills for our customers."

Russell Messer
Messer-Wolf, Inc., Lawrence, Kansas

"When Kodak puts pre-lubrication into a Pageant Projector—smoother, longer-lasting performance is what comes out. That's why we find it good business to recommend the Pageant."



Mel Price
Mel's Photo Shop, Montgomery, Alabama

EASTMAN KODAK COMPANY, Dept. 8-V, Rochester 4, N. Y.

Send name of nearest Kodak Audio-Visual Dealer and information on:

- ☐ **Kodascope Pageant Sound Projectors**
- ☐ **Kodaslide Signet 500 Projector, Filmstrip Model**

NAME_____ TITLE_____

ORGANIZATION_____

STREET_____

CITY_____ STATE_____
(Zone)

1-193

TIN PHOTOGRAPH FRAME

(Continued from page 20)

Materials and Equipment Required

Ruler, colored pencil, metal snips, piece of lightweight flexible sheet tin 6¾ by 8 in., sufficient scrap tin for strips, cold chisel, 2-in. nail or screw with flattened point, block of wood slightly larger than frame, piece of wood ¼ in. thick for bending strips, round pencil or piece of dowel, hammer, soldering iron and solder, fine steel wool, clear lacquer, and application brush.

Procedure

Cut a piece of tin 6¾ by 8 in. Using a colored pencil, mark horizontal and vertical dividing lines through center and measurement and design lines according to pattern. Cut off corners as indicated. Make a right angle incision about 1 in. long in center with a cold chisel over wood block. Bend back corner, insert snips and cut out opening. The straight lines may be followed more easily if an oval section is removed first. The inside edges must be rolled before the outer. Start the roll by bending both ends of the tin edge down to the center of the pencil or dowel with thumb and forefinger. Then hammer entire length in even contact, avoiding dents. Pressing the tin to the pencil, turn until roll is completed, then pull out pencil. The dots are made by hammering on a nail with a flattened point, and the diamond with the cold chisel on the front of frame over wood block. Punch ⅛-in. hole through center dot of top diamond for hanging.

balanced
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MEANS EVERY DETAIL PRECISELY RIGHT FOR BETTER, FASTER PRECISION MEASURING
only Starrett
MICROMETER CALIPERS
give you these
12 BIG FEATURES
All in perfect balance for
• Easy Handling
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1. BALANCED DESIGN — Advanced Design Throughout with Correct Thimble Diameter Insures Perfect Balance, Easy Handling and Better Readability.
2. NO-GLARE SATIN CHROME FINISH — On Thimble and Sleeve of all Micrometers and also on Frame of all Full Finish Micrometers. Easy to Read — Eliminates Squinting and Eye Strain. Highly Resistant to Stains, Corrosion and Wear.
3. HI-MICRO LAPPED MIRROR FINISH — On Faces of Anvil and Spindle. Insures More Accurate Measurements. Also Available with Tungsten Carbide Faces at slight additional cost.
4. ONE-PIECE SPINDLE — Extra-Rigid Integral Construction for Long, Accurate Life.
5. EXTRA HARD THREADS WITH EXTREMELY FINE LEAD ACCURACY — Special High Carbon Steel Gives Harder Threads Which are Hardened, Stabilized and Precision Ground from the Solid Under Temperature Controlled Conditions to Insure Lasting Precision.
6. TAPERED FRAME — Permits Measurements in Narrow Slots and Tight Places. Standard on All Full Finish Outside Micrometers.
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Personal News

CHARLES A. ROPER DIES

Charles A. Roper, special representative and editor-in-chief of McKnight & McKnight Publishing Company, died Thursday morning, October 21, 1954, in Laughlin Hospital, Kirksville, Mo.

Charles A. Roper
— Portrait by Burkart, Peoria, Ill.

He joined McKnight & McKnight Publishing Company in 1933. He was born in Green County, Mo., December 7, 1887. He was a graduate of Kansas State Teachers College, Pittsburg, Kans., taught school, and later joined the Manual Arts Press of Peoria, Ill., before joining McKnight & McKnight Publishing Company.

He married Gladys M. Root, March 10, 1912.

Mr. Roper served in the navy during World War I. In 1953 he was chosen a laureate member of Epsilon Pi Tau, national honorary industrial education society, in recognition of his work in helping to create textbooks. He had served as captain and commodore of "The Ship," national organization of booksellers, and was a member of the Christian Church of Republic, Mo.

His survivors are his wife, a daughter, two grandchildren, two brothers, two sisters, and several nieces and nephews.

DEATH OF CHARLES H. BAILEY

Charles H. Bailey, emeritus professor of manual arts, Iowa State Teachers College, Cedar Falls, Iowa, died on May 20, 1954, at the home of his son, Grant C. Bailey, Bartlesville, Okla., after a brief illness.

Charles H. Bailey was born in Iowa City, Iowa, and was a graduate of Iowa State University, degree B.S. in Civil Engineering, 1895; also of Teachers College, Columbia University, New York City, degree B.S., with Diploma for Manual Training in Secondary Schools.

He was also a student at the Cook County Normal School (now Chicago Teachers Col-

(Continued on page 20A)

I.A.A. ADDS SPECIAL AWARDS
1955 Program emphasizes ingenuity and creative design
INDUSTRIAL ARTS AWARDS
FORD MOTOR COMPANY

To give added encouragement and recognition to advanced thinking and experimentation, the IAA has broadened its program to include *six special awards!* There will be three awards for projects displaying the most ingenuity in their conception . . . three for projects with the most outstanding creative design.

ALL PROJECTS ELIGIBLE

Students in grades 7 through 12 are eligible to enter. IAA's 14 divisions cover practically any school project. There are cash prizes totalling $50,000. The 30 Outstanding Achievement Award winners and their teachers will be three-day guests of the Ford Motor Company in Detroit.

Extra FORD ENGINEERS TO TEST PROJECTS

Any exceptional models of planes, cars, boats, etc., featuring technical innovations such as radio-controlled models, will be referred to Ford engineers for practical laboratory tests. Outstanding entries will go on public display in selected areas throughout the nation, and in the famous Ford Rotunda during the summer and autumn of 1955.

Send this coupon for free IAA rules booklet and entry blanks.

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PERSONAL NEWS

(Continued from page 18A)

lege) under the late Col. Francis W. Parker; and took special work in the shops of Sibley College of Engineering, Cornell University, Ithaca, N. Y.

Following two years of experience as inspector and superintendent of construction with a firm of consulting engineers in Des Moines, Iowa, he was appointed supervisor of manual arts in the city schools of Iowa City, where he served from 1897 to 1902. In this position he succeeded the late Dr. Samuel D. Bawden, eldest brother of Dr. William T. Bawden, who was the first teacher of manual training in the Iowa city schools.

Bailey was head of the department of manual training, James Millikin University, Decatur, Ill., 1903–1905. In September, 1905, he became head of the department of Manual Arts, Iowa State Teachers College, Cedar Falls, and in 1921, the name was changed to Department of Art and Manual Arts. He remained at Iowa State Teachers College 43 years, retiring in July, 1948.

In 1909, Bailey became one of the 12 charter members of the Manual Arts Conference of the Mississippi Valley. Only four of these twelve are now living, and all of them are retired.

He is author of *Mechanical Drawing for Beginners*, and wrote numerous articles for professional journals.

ALVIN R. LAPPIN MADE ASSISTANT PROFESSOR

Alvin R. Lappin has been appointed assistant professor of industrial arts at the Los Angeles State College of Applied Arts and Sciences. He will be associated with Claude E. Nihart in the continued development of the newly established industrial-arts department.

Lappin comes to Los Angeles State College with an A.B. Degree from the University of California, Santa Barbara College; a masters from Wayne University, where he is also a candidate for the doctorate. He holds diplomas or certificates from four technical schools, including Los Angeles Trade-Technical Junior College (formerly Frank Wiggins Trade School); and has had extensive teaching experience in his field on all grade levels from elementary school through graduate study. His teaching and supervisory years included work in California, Illinois, Michigan, and North Carolina. An additional five years were spent in industry.

Mr. Lappin is the teacher of the student who won the Outstanding Achievement Award in the Plastics Division of the 1950 Industrial-Arts Awards Competition.

♦ Al Vezzani of the Vocational Education Department of the University of Michigan is being *loaned* to the Mexican government for two years. He will direct a school to train operators and mechanics of highway construction equipment.

♦ John C. Switzer of the Glendale Junior College was selected by the scholarship committee of the Gateway Kiwanis Club to receive a $300 scholarship for industrial-arts study at the Los Angeles State College.

♦ Dr. Robert Steinem of the art department of State University Teachers College at Oswego, N. Y., will serve as a consultant to the Better Light Better Sight Bureau. The Bureau produces educational programs under the sponsorship of the Electric and Allied Industries "to foster a better understanding of the relationship of light and sight."

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News Notes

♦ Faculty and students of Wayne University's College of Education acted as host to outstanding national, state, local, and foreign educators on Thursday, November 18, when this Detroit institution celebrated its first annual "Education Day."

At that time, the *Wayne Education Award* was presented to the person chosen as one who had made an outstanding contribution to education in the United States.

Other awards also were made to citizen groups active in school problems and to outstanding pre-teachers in the College of Education.

Among the speakers were Dr. Paul Wagner, president of the Film Council of America; Dean Eldridge T. McSwain of the University College, Northwestern University; and Dr. Don Davis, head of the Division of Education at Kansas State Teachers College, Emporia, Kans.

♦ Publication of the third catalog of armed forces 16mm. motion pictures available for public nonprofit exhibition was announced by the Department of Defense.

A total of 251 films of the army, navy, air force, and marine corps are included in the sections of the catalog. In addition to films listed by services, sections of armed forces information and education and civil defense films have been included.

Films listed in the catalog are available for short time free loan. Borrowers must pay only the postage required to return the films.

For a copy of the catalog write to Pictorial Branch, Office of Public Information, Department of Defense, Washington 25, D. C. Only bona fide organizations can be honored due to the limited supply of catalogs.

♦ Safety in the home workshop is the theme of a 48-page booklet called "Tips to the Handyman-Hobbyist on How To Do It Safely." It is published by The Home Insurance Company, 59 Maiden Lane, New York 8, N. Y., and distributed as a public service. The booklet offers many important facts in safety to the millions of Americans who make their own home repairs and improvements or utilize tools in their hobbies.

♦ The American Iron and Steel Institute has published a teaching suggestions booklet and a new color filmstrip on the "Chemistry of Steel."

The filmstrip was produced by the education department of Hill and Knowlton, Inc. It is the second of two dealing with the science of iron and steelmaking.

"Chemistry of Steel" is intended primarily for high school chemistry classes.

One copy of the filmstrip is available free of charge to each school system upon request. A small charge is made for additional prints. The teaching suggestion booklet is available without charge.

♦ Bids are to be called for soon by the Inglewood Unified School District, Inglewood, Calif., for construction of 10 new buildings totaling 98,967 sq. ft., and costing $1,400,000 to be built for the Morningside High School in Inglewood. When completed the entire plant will have a capacity for 1500 students.

♦ The James F. Lincoln Arc Welding Foundation has announced the eighth annual competition of its engineering undergraduate design program for the 1954–55 school year. The program offers 46 awards for papers of no more than 20 pages in length presenting the welded design of a machine, machine part, structure, or structural part. The top award is $1,250.

(Continued on next page)

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NEWS NOTES

(Continued from previous page)

All engineering undergraduates are eligible to compete for the cash awards and the national recognition which accompanies the awards. Competition is for undergraduates only and has been arranged so that frequently entries can be prepared from work that has been done for normal undergraduate study. It is a competition for mechanical or structural designs, separate awards being offered in each division. Because it is a design program, familiarity with the actual mechanics of the arc welding process are not a prerequisite for participating.

No special conditions, forms, or fees are needed to enter. A Rules and Conditions booklet illustrated with previous award designs is available from *The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.*

♦ The United States Civil Service Commission announces that applications are being accepted for Equipment Specialist positions paying $5,940 a year at the Raritan Arsenal in Metuchen, N. J.

To qualify, applicants must have had progressive experience in the maintenance, inspection, repair, or in the complete manufacturing process of the following types of equipment: antiaircraft, armament, automotive, combat vehicles, fire control, guided missiles, electronic fire control. No written test is required.

Full information regarding the examination and application forms may be obtained at many post offices throughout the country, or from the U. S. Civil Service Commission, Washington 25, D. C. Applications will be accepted by the Board of U. S. Civil Service Examiners, Raritan Arsenal, Metuchen, N. J., until further notice.

♦ The New York Board of Education approved plans for the new Aviation Trades High School, to be built in Long Island City, Queens. The school, which is designed to train young men in the repair, maintenance, and construction of aircraft, will be the largest of its kind in the United States.

♦ Seventy-four students enrolled in industrial arts in the schools in Indiana were awarded prizes in the 1954 Ford Industrial Awards Contest. These students were taught by twenty teachers in eleven cities in this state.

♦ *The Industrial Arts Teacher,* official publication of the American Industrial Arts Association, will be mailed without cost to industrial-arts teachers and supervisors. Send name and address on post card or letterhead to P.O. Box 2350, Buffalo 23, N. Y.

♦ An international exhibit of 126 paintings by junior and senior high school students was held November 18–30 at American Red Cross national headquarters in Washington, D. C.

The showing was sponsored jointly by the Red Cross and the National Art Education Association, of the National Education Association. It was open to the public each weekday from 8:15 a.m. to 5 p.m.

The 126 paintings selected for the exhibit are representative of some 6000 which were done during the last year in the Junior Red Cross International School Art program. About 1000 came from overseas.

Under this program a selection of the best work of student artists in the United States is sent to schools in U. S. territories and foreign countries. Work by foreign students is sent to this country.

In the exhibit, 22 states, Alaska, Hawaii, Puerto Rico, Australia, Ecuador, Greece, Ireland, Japan, and the Philippines were represented.

♦ The 250th Anniversary of the birth of Benjamin Franklin will be celebrated January 17, 1955. Write to the 250th Anniversary Committee, Franklin Institute, Philadelphia 3, Pa., for helpful suggestions to make your own celebration a success.

♦ San Diego City Schools, San Diego, Calif., have issued a very interesting Report to the Community titled *100 Years of Public Education in San Diego — July 1, 1854 to June 30, 1954.*

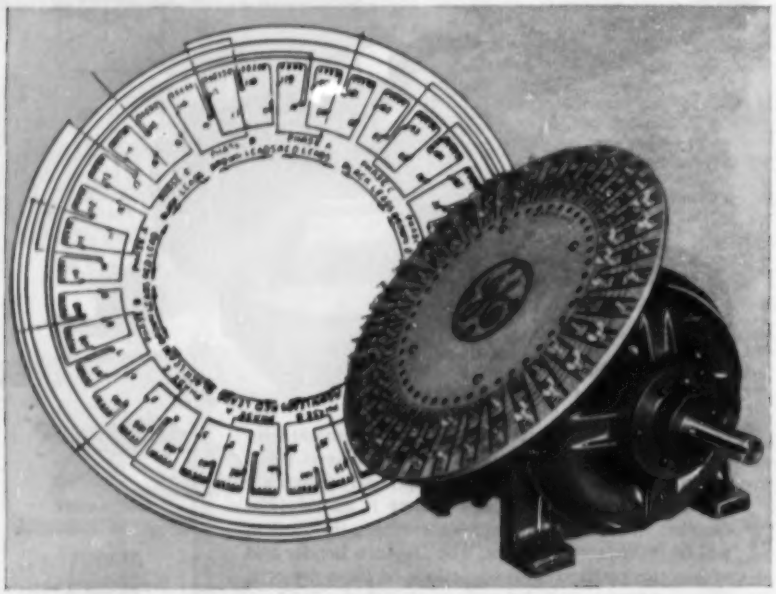
It is a 24-page brochure beautifully illustrated.

♦ The annual report of 1953–54 of the general superintendent of schools, Chicago, Ill., consists of a 32-page, well-illustrated brochure which presents a comprehensive overlook of the educational offerings of the second largest city in America.

♦ The G.K.F. Netherlands graphic design exhibition was held at Chicago, Ill., November 4 through December 3, at the Institute of Design, Illinois Institute of Technology.

INDUSTRIAL-ARTS TEACHERS TOUR DeVILBISS

About 100 Northwestern Ohio industrial arts teachers recently toured the DeVilbiss Company, and saw workmen manufacture spray guns, air compressors, and other allied equipment used in many industrial-arts courses. J. F. McCaslin, head of customer research, explained the use of the company's products while George I. Stoddard, instructor in charge of the company's spray painting school, gave the teachers pointers on handling spray guns. The group visited the company's customer research laboratory and witnessed tests being conducted for manufacturers who will receive DeVilbiss recommendations on the best methods of spray finishing their particular product.



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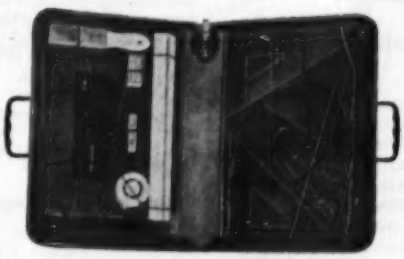

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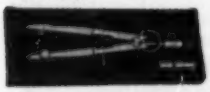

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New Publications

Diesel Engine Operation and Maintenance

By Vladimir L. Maleev. Cloth, 504 pp., 6⅛ by 9¼ in., illus., $6.50. McGraw-Hill Book Co., New York, N. Y.

This is a comprehensive treatise covering the construction, operation, maintenance, and repair of modern Diesel engines.

Each part of the engine is clearly described. Probable troubles also are discussed and methods of repair and adjustment are given.

There are questions at the end of each chapter which help the reader or the teacher in checking what has been learned about this technical subject.

Blueprint Reading for the Machine Trades

By Robert H. Fortman and James McKinney. Cloth, 122 pp., 5⅛ by 8½ in., illus., $2.25. American Technical Society, Chicago, Ill.

The authors hold to the idea that every machinist need not be able to make a good working drawing of every piece that they work upon, but they know that every mechanic in the machine shop must be able to interpret the blueprints which are given him for every job that he must make.

With this as a starting point they have described in this book the principles of the working drawing; basic lines and dimensioning; number of views, sections, and cross hatching; scale drawings; working and assembly drawings; gear drawings, and abbreviations used on drawings.

Financing Adult Education in America's Public Schools

By Edward B. Olds. Summary Report, 20 pp., 6 by 9 in., 25 cents. Complete Report, 124 pp., 6 by 9 in., $1.25. National Commission on Adult Education Finance, 1201 — 16th St. N.W., Washington, D. C.

This study on the financing of adult education in public schools was made by the Adult Education Association of the U. S. A.

It presents the startling fact that 3,000,000 adults are now enrolled in public schools at a per pupil per year cost of $26.60 as contrasted with $235 for the cost of childhood education.

History of the Theories of Aether and Electricity

By Sir Edmund Whittaker. Cloth, 319 pp., 6¾ by 9¼ in., $8.75. Philosophical Library, Inc., New York, N. Y.

A comprehensive, scientific discussion of the changes brought about in the study of physics by such discoveries as special relativity, the older quantum theory, general relativity, miatrix mechanics, and wave mechanics.

Machine Shop Operations and Setups

By Harold W. Porter, Charles H. Lawshe, and Orville D. Lascoe. Cloth, 397 pp., 5¾ by 8½ in., illus., $5.50. American Technical Society, Chicago, Ill.

An excellent text, the writing of which was preceded by a number of surveys to discover the needs of the students and teachers who would make use of the book.

It contains a list of basic trade terms and descriptions of approximately 450 machine-shop operations covering eleven major areas which also were incorporated after they had been chosen by fifty industrial machinists and fifty shop instructors.

Described in the text are bench tools, layout work, power hack saws, drill presses, engine lathes, lathe setups and operations, shapers and planers, milling machines, and grinding machines.

Guide to Audio Reproduction

By David Fidelman. Paper, 240 pp., 5¾ by 8¼ in., illus., $3.50. John F. Rider Publisher, Inc., New York, N. Y.

A comprehensive text on the principles and techniques of sound reproduction. It is designed specially for radio experimentors, amateurs, servicemen, and others who want to understand the design and construction of sound reproduction equipment.

Bricklaying Skill and Practice

By J. Ralph Dalzell and Gilbert Townsend. Cloth, 195 pp., 5⅛ by 8½ in., illus., $3.50. American Technical Society, Chicago, Ill.

This is a second edition of this handy and useful book for the apprentcie as well as for the "Do it Yourself" addict.

The book describes in simple terms just how to acquire typical brick laying skills, lay up walls, fireplaces and chimneys, and building with SCR (2⅛ by 5½ by 11½-in. brick developed by the Structural Clay Products Research Foundation).

The book is freely and well illustrated.

(Continued on page 26A)

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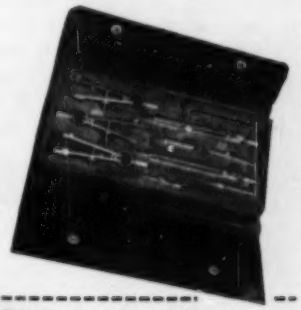

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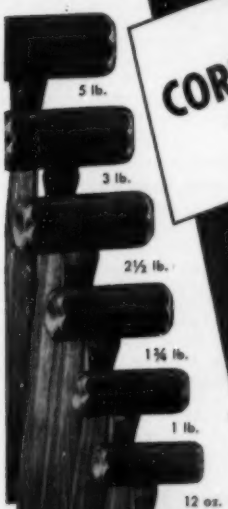

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THE ART OF TILE SETTING

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Makes a popular project more interesting than ever! Presents plans and describes construction of all kinds of structures from nesting boxes and bird houses to elaborate apartments and cottages. Hundreds of variations are possible from 17 basic patterns. Covers principles of design necessary to attract different species . . . location of boxes . . . protection from enemies and elements . . . ventilation, cleaning, etc. Has much related information on birds . . . over 59 working drawings and sharp photos of birds and their homes.

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This book gives a simple and understandable explanation of electricity, and how the power company brings electric service to the farm. In clear and concise language it discusses electric service on the farm; safety devices — what they are and how they operate; how the power company bills for electricity used; the care of motors; etc. Includes handy reference tables giving estimated capacity and average consumption of electrical appliances and farm equipment.

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NEW PUBLICATIONS

(Continued from page 24A)

How You Can Get a Better Job

By Willard K. Lasher and Edward A. Richards. Cloth, 221 pp., 5⅝ by 8½ in., illus., $2.50. American Technical Society, Chicago, Ill.

This is the third edition of this useful book written in a chatty style. It is good reading for every employee especially for those who want to advance. The rules given may be trite; they are worth-while nevertheless.

Building Construction for Craftsmen and Builders

By C. Lloyd. Cloth, 168 pp., 7¼ by 9¾ in., illus., $3.50. St. Martin's Press, New York, N. Y.

A rather unique book for apprentices and beginners in carpentry and allied building trades. It treats of much more than carpentry, however, because brickwork and masonry, brick veneer, concrete, stair and roof construction, and form making for concrete work also are discussed.

The book contains 68 full-page plates replete with instructive sketches. The descriptive matter is printed opposite each plate.

While the book was originally intended for apprentices and students in Australia, it is nevertheless a good reference book in our country as well.

How to Read Electrical Blueprints

By Gilbert M. Heine, Carl H. Dunlap, and revised by C. S. Jones. Cloth, 311 pp., 5¼ by 8½ in., illus., $4.75. American Technical Society, Chicago, Ill.

This book is both a text and a reference book. For the industrial worker it will be a handy reference manual in his toolbox, while for the student of electricity it will be a very helpful text in learning how to read architectural blueprints, bell and signal wiring diagrams, housewiring blueprints, motor and generator wiring diagrams, motor control diagrams, and power station blueprints.

Elements of Mathematics for Radio, Television, and Electronics

By Bernhard Fischer and Herbert Jacobs. Cloth, 569 pp., 5⅝ by 8⅜ in., illus., $5.40. The Macmillan Co., New York, N. Y.

This text presents a comprehensive treatment of mathematics as it is applied to electrical computations. It covers the subject by presenting arithmetical, algebraic, geometrical, and trigonometric problems, as applied to electrical and business transactions and shows step-by-step solutions for solving these problems.

The use of logarithms and the slide rule also is explained. The appendix contains several very useful tables.

The Microphysical World

By William Wilson. Cloth, 216 pp., 4¼ by 6¾ in., $3.75. Philosophical Library, New York, N. Y.

An interesting little book on very small things.

It describes the atomic theory, atoms and molecules, spectra, cathode, and X-rays, electrons, radiant heat, hydrogen and helium atoms, the quantum theory, the electron orbits of atoms, light, atomic nuclei, the artificial transmutation of atomic nuclei, the inside of the nucleus, and miscellaneous other phenomena.

It also contains a bibliography of reference books.

SHOP EQUIPMENT NEWS

(Continued from page 36A)

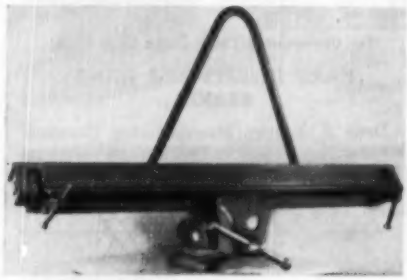
cart. Perfect for moving parts or merchandise from place to place . . . for picking orders, for maintenance work, for vault and parcel post trucking, for transporting office supplies, typewriters, etc. It is of sleek, modern, streamlined design . . . no exposed bolts, nuts or rivets. The carts move smoothly and easily on big 5-in. rubber-tired wheels, stationary in front, swivel in the rear. They are of heavy steel construction with round beaded edges . . . attractive olive green baked-enamel finish. Strong and rigid, these stock carts will handle loads up to 600 lb. with an ample factor of safety. The two shelves are each 4 in. deep — Top shelf may be inverted for flat surface use. This cart is 36 by 24 by 36 in.

The firm will supply further information on request.

(For Convenience Circle Index Code 0110)

SHEET METAL BRAKE

Television Accessories Company announces the availability of a new bulletin describing the A. B. Parker Sheet Metal Folding Machine, which forms all types of boxes, brackets, and



A. B. Parker Sheet Metal Brake

chassis from aluminum, copper, brass, or steel up to 18 gauge by 24 in. wide.

This brake is portable and inexpensive and should be of considerable interest to engineers and designers, school-shop instructors, as well as machinists, and sheet-metal workers.

Full information will be mailed on request.

(For Convenience Circle Index Code 0111)

IMPROVED TRACING PAPER AND CLOTHS

Six newly improved tracing papers and cloths have been introduced by the Charles Bruning Company. Superior translucency, permanence, uniformity, penciling, and erasability are claimed for the new materials.

Improved Tracing Paper and Cloths

Literature and samples just released enable prospects to evaluate the improved characteristics by means of simple *do-it-yourself* tests. The firm is also offering a five-yard, 36-inch sample roll of its new general purpose tracing paper for one dollar — less than half the regular price — to facilitate comprehensive testing.

The three tracing papers are odorless and completely *cured*, so that they will not become brittle or lose proper transparency. The fine-grained surface is specially processed for accepting pencil lines with strong opacity.

Outstanding among the three tracing cloths is the Whitney No. 378, which accepts both ink and pencil equally well. Ink lines do not chip or flake off, and pencils as hard as 9-H neither *skip* nor damage the surface. Obtainable in blue and white, it also features water repellence, making it impervious to common solvents, spilled liquids, and perspiration stains.

The sample five-yard roll for one dollar, or literature and free 8½ by 11-in. samples of all papers and cloths may be obtained by requesting it.

(For Convenience Circle Index Code 0112)

LARGE GLASS TANKS

The Pittsburgh Plate Glass Company has constructed an aquarium that is 9 ft. long, 4 ft. deep, and 2 ft. wide, for the Detroit Municipal Aquarium. It holds 540 gallons of water, and is made of heat-tempered glass (Herculite), and for added strength and durability held in position with brass rods.

(Continued on next page)

Now! For the First Time!

A MACHINE TOOL ENGINEERED 10-INCH TILTING ARBOR SAW!

THE NEW BOICE-CRANE MASTER-MONOTROL*

(PAT. APPLIED FOR)

None of the questionable quality and dubious accuracy of 10-inch saws intended for homecraft use only! The new Master-Monotrol*, without modification or extra attachments, cuts boards plumb square, rips to the center of 70" wide stock and 3⅛" thick super straight, and cuts miters that really fit! It has the capacity and sturdiness required for producing superior cabinet work, pattern making, and all other woodworking. It is the first 10-inch saw guaranteed to permanently retain accuracy, even with hard, abusive use.

NEW TYPE TRUNNION AN EXCLUSIVE FEATURE
All critical parts, support surfaces, bearings and contacts are really oversize, extra rugged. Many actually equal in size to those on 12-inch saws.

NEW MONOTROL* BLADE POSITIONING SYSTEM
Each and every adjustment for any cut is made at the front by means of a single control. Eliminates hazardous reaching around the saw. Saves much time on variety work. The higher arbor speed, 4000 r.p.m., assures fast, smooth and accurate, straight or angular cuts ALWAYS.

33⅓ TO 50% MORE POWER
The first fully powered, foolproof 10" saw using motors in sizes up to 2 H.P. polyphase, 1½ H.P. one phase. Assures freer sawing and elimination of many accidents resulting from kickbacks which follow attempts to get the motor out of a stall when the blade binds. It is no longer necessary to buy an oversize 12" saw simply to get sufficient power on 3-inch cuts of hard material. The overhung pulley is never removed for easy changing of motor or belts. The power-packed 3-belt drive utilizes larger pulleys and long-life V-belts.

SAFER FOR RIGHT-HANDED OPERATORS
Controls and locks completely guarded. New front-operated, instantaneous cut-off switch. The blade is tilted to the left, away from the hand used for feeding by most right-handed men.

A new, exclusive, rigid, steel, "all-purpose" insert, for sawing with blades or for grooving or rabbetting with dado heads, eliminates the need for a second throat piece and constant interchange. The heavier, double-locked, ground, cast iron fence, with entirely new micro-control, is 1¼" wide and 2½" high. The saw is 34-inches high. The 20" x 27½" top, with side wings, affords a work area of 36" x 27½".

Now, there really IS a new and BIG difference in saws.

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SHOP EQUIPMENT NEWS

(Continued from previous page)

Techniques used in fabricating this large tank were developed through production of smaller size tanks for industrial uses.

The all-glass tank, first introduced during World War II, has found widespread use in diversified industrial operations. Mills, factories, and plants experiencing difficulty in holding acids or chemicals in tanks that would be subject to deterioration by the solutions are now using glass tanks. These outlast tanks made of other materials.

Electroplating produced in glass tanks is of very high quality due to lack of contamination of the solution and elimination of strong electrical currents.

Free-standing clear-glass tanks such as the one made for the Detroit Aquarium, but smaller in size, are also being used in restaurants and other public places as feature attractions.

(For Convenience Circle Index Code 0113)

TECHNICAL CLOSE-UP ATTACHMENT FOR COLOR PHOTOGRAPHY

To make precision close-up color photography considerably easier, the Eastman Kodak Company has announced a newly developed technical close-up attachment.

The attachment is offered in two forms. One, for making close-ups with a Kodak Pony 135, Model B or 828 camera, is known as the Kodak Pony Close-up *Kit*. It includes the framing attachment, supplementary lens and filters, and special Close-Up Flashguard.

The Kodak Technical Close-Up Outfit, including Kodak Pony Camera and Flashholder

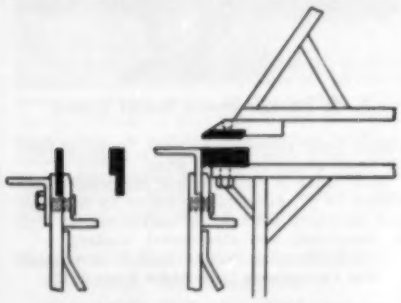
The other, called the Kodak Technical Close-Up *Outfit*, includes the Kit and everything else needed for close-up technical photography — Kodak Pony 828 Camera, flashholder, and attachments, all in one ready-to-use package.

The Technical Close-Up attachment is designed to produce color photographic transparencies of maximum quality with a minimum of difficulty.

(For Convenience Circle Index Code 0114)

HARD INSERTS FOR HAND BRAKES

Dreis & Krump Manufacturing Company announced a change in design of all models of their line of Standard Hand Brakes and



Hard Inserts for Hand Brakes

Universal Box and Pan Brakes to incorporate hard inserts for bending leaf bars and also for the top nose bar and bottom bar. It is claimed that these hard inserts increase the life of the bending edges. These inserts are also easily removed and replaced.

(For Convenience Circle Index Code 0115)

KIT NO. 4 IN THE SCHWEIZER ALUMINUM SERIES

Each kit in the Schweizer Aircraft Corporation series (there are six in all) is a complete project in a single package. All details completely worked out, designed and prepared specifically for school shop use in all age groups. A very minimum of advance preparation is necessary to incorporate the program in your classes. Everything is included down to the last rivet. All materials, hardware, rivets, instructions, blueprint, and rivet set. Nothing extra to buy — no special tools required.

Other Schweizer construction kits include the ever popular Utility Case Kits, the U.H.F. "Bow Tie" Antenna Kits, and the Multi-

(Continued on page 30A)

"Is your sheet metal department up to par?"
Here is a list of sheet metal tools and equipment patterned after recommendations of various State Bureaus of Standards.
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SHEET METAL EQUIPMENT AND TOOLS FOR A CLASS OF 12 STUDENTS
BRODHEAD GARRETT CO.
50 Years Serving School Shops of America
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gives you HEAVY-DUTY FLASKS
engineered from
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OVER 4500 FOUNDRIES USE *STERLING* STEEL FLASKS

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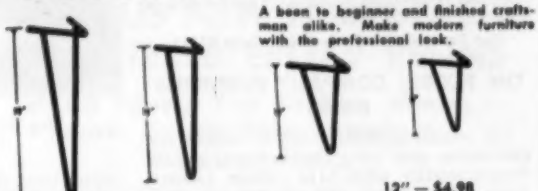
Milwaukee 14, Wis., U. S. A.

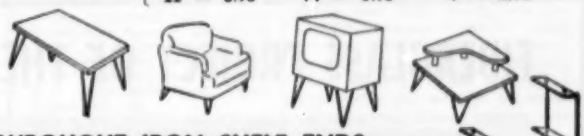
Beautiful Legs
OF WROUGHT IRON

25% OFF TO TEACHERS

A boon to beginner and finished craftsman alike. Make modern furniture with the professional look.



LIST PRICE Set of 4			
	30" — $8.98	18" — $5.98	12" — $4.98
	28" — 7.98	16" — 5.98	9" — 4.48
	22" — 6.98	14" — 5.98	6" — 3.98
			4" — 2.98

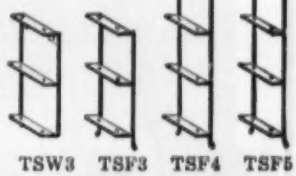


WROUGHT IRON SHELF ENDS
Color: Black

Each bracket 6¼" wide neatly welded and drilled for shelves any depth or length. 10½" between shelves.

WALL STYLE
2 Shelf.....$1.99 pr.
3 Shelf..... 2.49 pr.

FLOOR STYLE (footed)
3 Shelf.....$2.99 pr.
4 Shelf..... 3.49 pr.
5 Shelf..... 3.99 pr.



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And they are:
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ORDER NOW: As a special offer Dek-Tufts may be purchased by schools at 6¢ per square. Choice of decorator's colors: forest green, lime, grey, red, ivory, beige, tuscan wine and black. A box of threaded matching nails is only 25¢.

Write today:
Free samples and literature are available.

JAYDON, INC.
482 Broome Street, New York 13, N. Y.

SHOP EQUIPMENT NEWS

(Continued from page 28A)

Purpose Tray Kit, which offers an exceptionally fine starting project for junior high grades.

All of these projects make fine Christmas gifts.

(For Convenience Circle Index Code 0116)

THE FLXIBLE COMPANY FURNISHES BUSES

The steadily-growing group of colleges and universities, now using Flxible buses, was increased recently when Lane College, Jackson, Tenn., took delivery of a 33-passenger Visicoach, to be used by the college's athletic teams, band, choral club, and for various other social and educational activities.

The 33-Passenger Visicoach

(For Convenience Circle Index Code 0117)

FIBERGLASS PROJECT OF THE MONTH

AN ARTICLE BY ALEXANDER F. BICK in the December, 1954, issue of "Industrial Arts & Vocational Education" described and illustrated the laminating technique with cold setting resin and fiberglass fabric. It emphasized the simplicity of the process which enabled seventh and eighth grade pupils to produce the tables and bowls illustrated.

William Weers

William Weers of The Castolite Company, who pioneered the process of embedding and preserving scientific specimens in clear plastic, has this to say about these new materials: *"A realistic and practical educational program in the Industrial Arts departments should include at least a basic knowledge of the simple chemistry of plastics. Liquid resins are combined with fiberglass fabrics to make such varied items as boats, sport cars, bullet-proof vests, furniture and other articles requiring strength, light weight, durability and 'looks.' All of them can be formed by a simple hand lay-up method which makes them especially suitable for class work. The technique is sufficiently flexible to enable teachers and students to develop their own projects."*

How Industrial Arts Departments Can Use These New Materials

It is not necessary to set up a course in plastics. Professional results can be achieved with simple hand tools and facilities available in the smallest shops. Project costs are in line with similar work in wood and metal and no special skill is required to work with fiberglass.

It was obvious from the beginning that this entire program was just a "natural" for the wood and metal shop. The most distinctive designs were those that combined metal and wood (for legs and bases) with the plain or decorated fiberglass trays, bowls and table tops.

There is a logical tie-in with the Art Department. Fabric designs and silk screen printing on glass cloth and other textiles are an integral part of this immensely fascinating and stimulating activity.

What about the students? "They just eat it up!" one teacher commented. Indeed they do, because there's something akin to magic in converting a liquid raw material into a lovely piece of furniture that has all the "class" and glamour of a famous designer's creation.

Free How-To-Do-It Projects

A reprint of the Bick article, complete with detailed instructions and material specifications, will be mailed free of charge to *teachers* of Industrial Arts and Art Departments. Additional copies for classroom work will be furnished at cost. Subsequent project reprints will be mailed automatically. Write to: *School Department A50, The Castolite Company, Manufacturing Chemists, Woodstock, Illinois.*

Producers and Distributors of Casting, Laminating, Coating and Molding Resins — Serving Industry, Science, the Arts and Crafts.

Descriptive Material

NEW SOUTH BEND LATHE CATALOG

South Bend Lathe's new Attachment and Accessories Catalog 5418 illustrates and offers full specifications on their complete line of machine tool attachments and accessories.

Subject matter covers all attachments and accessories for the South Bend precision toolroom and engine lathes (9 in. through 16–24-in. swings), turret lathes, drill presses, 7-in. bench shaper and 8 or 10-in. pedestal grinders.

Your copy is available from distributors in principal cities or direct from South Bend Lathe Works.

(For Convenience Circle Index Code 0118)

NEW WALL CHART SHOWS HOW TO MAKE 100 MOLDINGS, ILLUSTRATES 53 DELTA KNIVES

A new 35 by 45-in. wall chart illustrating all 53 Delta molding cutter knives and showing how to make 100 of the most popular moldings which can be produced with these knives has been issued by Delta Power Tool Division of Rockwell Manufacturing Company.

The multi-color chart retails for 50 cents. It includes schematic drawings of knife settings for making shapes for table edges and legs, hand and chair rails, picture frames, window sills, doors, drop leaf table joints, drawer joints, glue joints, cabinet drawers and sashes.

Where a series of cuts with different knives is required to complete a molding, the drawings show graphically — by means of graduated shadings — the proper sequence of cut. Basic standard patterns such as quarter rounds, ovolos, ogees, and cove moldings are shown along with more complex shapes.

Actual size silhouette photos of each cutter knife are laid out along the entire border of the chart so that the user can design his own moldings readily.

(For Convenience Circle Index Code 0119)

A NEW PREFABRICATED PANEL

Reynocell is the name of a new material which the Reynolds Metals Company offers in the shape of a new panel.

These panels are light, strong, rigid, prefabricated structural units. They have a honeycomb core of resin-impregnated kraft paper to which the aluminum facings are securely bonded.

Panels made 4 in. thick weigh 1.46 lb. per s.f. This material is fire and moisture proof, and may be used for billboards, pallets, platforms, stage scenery, and trailer and truck body parts.

A 1 by 4 by 6-in. sample Reynocell panel can be obtained.

(For Convenience Circle Index Code 0120)

REVISED BOOKLET ON HOME DEVELOPING, PRINTING, ENLARGING

The Eastman Kodak Company has just released a newly revised booklet which shows that "developing, printing, enlarging with Kodak materials" is not only fun, but easy to do. Priced at 35 cents, it is available from Kodak dealers and is an up-to-date version of the long-popular publication on home developing, printing, and enlarging.

(For Convenience Circle Index Code 0121)

Whatever Your School Shop Lumber Needs... ask for

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FABULOUS NEW FIBERGLAS — POLYESTER & EPOXY RESINS

Build Sports Car Bodies, Boats, Work Bench Tops, Awnings, Furniture, etc.

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Our "COVER-IT KIT" contains the right amount of material for the beginner student, or to experiment with yourself. Let's you see how easy it is to repair boats, toys, lamps, furniture, etc.
Complete Kit.....$3.95

Send for FREE literature giving complete buying information on EVERYTHING you need in Fiberglas — Plastic for the school shop. It describes in detail Glass Cloth, Resins, Extenders, Catalysts, Solvents, "How-To" Books, etc. Also includes sample of this amazing new material for your inspection. Write today! . . . and plan to get EVERYTHING you need for the above, and other high interest projects, from PLASTIC PARTS & SALES!

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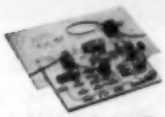

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Amazingly instructive: builds receiver, broadcaster, oscillator, signal tracer, wave generator, etc. With all parts, tube, instructions.
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"Ranger" AC-DC Radio Kit
Popular 5 tube superhet radio project kit. Thousands used in shop training. Teaches radio construction. Complete with cabinet.
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Vocational and Industrial Arts Books *from* AMERICAN TECHNICAL SOCIETY

Here is a checklist of books taken from the American Technical Society's 1955 catalogue. Look it over. We feel that the *right text* for your classes is on this list. But see *for yourself*. Check the books you want, and order on 30 day trial.

AGRICULTURE

- ☐ Farm Shop Skills in Mechanized Agriculture ($4.95)

AUTOMOTIVE

- ☐ Automotive Fundamentals ($5.25)
- ☐ Automotive Maintenance and Trouble Shooting ($5.95)

BUILDING

- ☐ Fundamentals of Carpentry, Part I ($3.50) & Part II ($4.50)
- ☐ Building Trades Blueprint Reading, Part I ($2.40) & Part II ($2.40)

DRAFTING

- ☐ American Technical Society's Drafting ($3.80)
- ☐ Applied Drawing and Sketching ($2.00)
- ☐ Creative Mechanical Drawing — Basic ($1.75)

ELECTRICAL

- ☐ Fundamentals of Electricity ($3.50)
- ☐ How to Read Electrical Blueprints ($4.75)
- ☐ Interior Electric Wiring, Part I, Residential ($4.25) & Part II, Industrial ($4.95)

MACHINE TRADES

- ☐ Blueprint Reading for Machine Trades ($2.25)
- ☐ Machine Shop Operations and Setups ($5.50)

PRINTING

- ☐ Graphic Arts Procedures ($3.75)
- ☐ A Workbook for the Graphic Arts ($1.75)

WELDING

- ☐ Electric Arc Welding ($4.00)

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State.....

AMERICAN TECHNICAL SOCIETY

Dept. W-210

848 East Fifty-Eighth Street, Chicago 37

Shop Equipment News

NOTICE TO READERS

Use the easy method of getting information on any of the items described in the shop equipment news. Circle the index code number or numbers on the business reply card found on the last page of this magazine.

NEW LOGAN 12-IN. "2500" LATHES

The new line of 12-in. swing Model 2500 lathes is now in production at Logan Engineering Company. The extra strength of the new lathes is distributed through wider gears, larger shafts, heavier bearing supports, heavier base and at other points result in more power,

New Logan 12-in. "2500" Lathes

more smoothness, and less vibration. The line consists of 8 lathes, four turret and four screw cutting models. Principal specifications are 12-in. swing over bed; 7¼-in. swing over saddle; 1⅛-in. spindle hole; 1-in. collet capacity; 23-in. and 35-in. centers. Variable speed drive or standard double V-belt drive is optional on all models at the same moderate cost.

(For Convenience Circle Index Code 0101)

NEW CHISEL WITH METAL CAP

A new plastic-handled tang butt chisel that will stand up under severe hammering because it has a protective solid metal cap on the handle tip has recently been put on the market by Greenlee Tool Company.

This new Greenlee No. 407 tang butt chisel is made in nine sizes ranging from ¼ in. through 2 in. It may be purchased singly or in sets attractively packaged in plastic rolls, hardwood cases, or metaledge fiber board boxes.

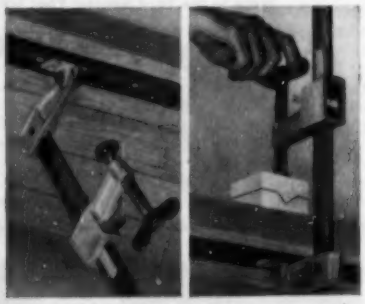
New Chisel with Metal Cap

This new chisel, called the Greenlee No. 407, is a lightweight, well-balanced tool with a thin, bevel-edged blade of high-carbon steel. The handle is made of green Tenite plastic, safe from flash fire, and having a rounded metal cap securely anchored to the handle by an inserted shank.

(For Convenience Circle Index Code 0102)

NO. 2203 STEEL TRACK FOR "JORGENSEN" HINGED CLAMPS

A new principle in the use of clamps is now made possible by using the No. 2203 Steel Track which is made available for all styles of "Jorgensen" Hinged Clamps by the Adjustable Clamp Company. This type of clamp, which has been on the market only for a few months, is "hinged" so that it swings on its mount in an arc of nearly 180 deg., up to or away from



Jorgensen Hinged Clamp on track

the work, but the track makes it adjustable sideways as well. In this way it can be used on a sawhorse or bench. There is no lost time looking for clamps, and the clamping operation is extremely rapid.

The No. 2203 steel track is furnished in 24-in. sections, and has a rustproof finish. It can be cut to shorter lengths, or butted together for longer lengths.

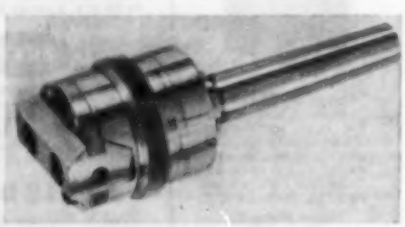
(For Convenience Circle Index Code 0103)

NO. 820 MICO BORING HEAD

The Mico Instrument Company has developed a new boring head.

This No. 820 boring head was developed to fill the need for a light and medium duty tool that could be relied upon for precision boring, facing, and threading operations. The Mico Head is adaptable to a wide variety of applications through the use of interchangeable shanks that are available. The compact sym-

(Continued on page 34A)



No. 820 Mico Boring Head

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LAMP PROJECTS

Of particular interest to instructors — in woodworking, general shop, plastics, crafts, electricity, and many other shop courses. Students can design and make the body of the lamp. We supply all other parts necessary—sockets, cords, plugs, shades, harps, switches, etc. Over 700 different parts shown in wholesale catalog. A MUST for all instructors occupied with highly educational and useful projects. Send 25¢ today for wholesale price list and parts catalog.

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SHOP EQUIPMENT NEWS

(Continued from page 32A)

metrical design with minimum overhang of the toolholding slide bar results in greater accuracy and longer life. The micrometer style adjusting collar with its widely spaced graduations permits rapid and accurate direct reading adjustments. One complete revolution of the collar moves the toolholding slide bar .050 in. radially.

The Mico Boring Head is made entirely of steel with all surfaces carefully machined to insure precision fit. Maximum offset capacity with the standard slide bar is ¾ in., and this can be increased to 1¼ in. by using the No. 810 slide bar, and to 2 in. with the No. 811 bar. All slide bars accommodate ⅜-in. diameter tool shanks.

The boring head length, less shank, is 1⅞ in., and its weight is ¾ lb.

An illustrated folder showing the boring head and available shanks and accessories will be sent on request.

(For Convenience Circle Index Code 0104)

ALL-PURPOSE ROLLER CABINET

A new All-Purpose Steel Cabinet, especially designed for all who use shop tools and instruments and desire to protect them against pilfering, has been designed by the Lumidor Manufacturing Company.

The construction, finish, and many features are such that it is equally applicable for use wherever fine equipment is used: for mechanics, hobbyists, home and business office.

The Lumidor Model 55 has an excellent durable dark green baked enamel finish. There are two chrome handles — one on each side — and the three long chrome drawer pulls are a desired convenience as well as adding much to appearance.

All-Purpose Roller Cabinet

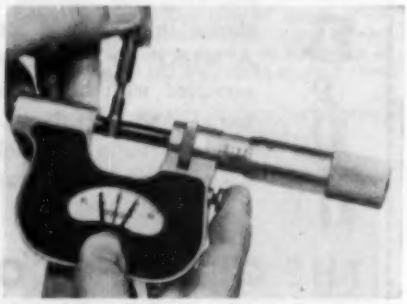
The cabinet has a top worktable, and the sturdy, wrap-around welded auto body steel construction encloses three pull-out drawers and a roomy storage cabinet. The top to bottom drawers are 2½, 3, and 5½ in. deep to handily house various size tools and equipment. Each drawer is 19¼ in. wide and 16½ in. deep. The two top drawers have quickly adustable dividers, and the bottom drawer is full capacity with no dividers. . . . Each drawer has Easy-Action Drawer Slide Rails to prevent sagging. The roomy storage compartment is 25 in. long, 16 in. deep, and 13 in. high and is provided with a lift-up, slide back disappearing door. A highly desirable theft-prevention feature is provided by a strong cylinder type lock (provided with two keys) which locks all three drawers and storage compartment on a one-lock all-lock idea. The cabinet rolls easily and silently on four durable, heavy-duty rubber-tired swivel casters (two of locking type). . . . Over-all dimensions: 25½ in. wide, 17 in. deep, 32 in. high. Approximate shipping weight — 92 lb.

(For Convenience Circle Index Code 0105)

THE "MASTER-COMPAR" INDICATING MICROMETER

An Indicating Micrometer providing *Visible Feel* to the user and having a range from 0-1 in., reading in .0001 in. is announced by the George Scherr Company, Inc.

"Tenths" are easily and unmistakingly read



Indicating Micrometer

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from an extra large dial. The indicating mechanism controls the measuring pressure so that all uncertainties due to differences in *feel* of individuals are eliminated. The *Master Compar* Indicating Micrometer really offers what its name implies, namely a Master Micrometer and a Comparator combined in *one* instrument. In addition, this tool provides the user, due to its ingenious design, with a complete set of Go and No Go Gages of 1-in. range, reading in .0001 in. A most important feature is that it detects out-of-roundness, ovalness, and taper. The fact that the release button for the movable anvil is on the right-hand side makes it a right-hand tool, enabling the operator to hold it the conventional way.

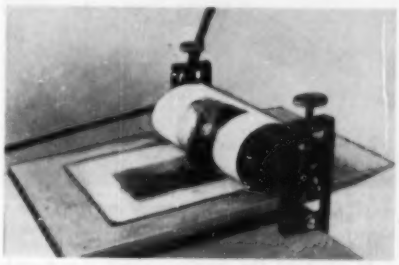
Heavy tungsten carbide anvils and finished hardwood case are standard equipment.

Illustrated circular obtainable on request.

(For Convenience Circle Index Code 0106)

THE NEW LASZLO UNIVERSAL PRESS

Rembrandt Graphic Arts Company announce that the interesting new features of the Laszlo Press are the enlarged size chase — 12¼ by 17 in. — and the new larger special lithographic stone — 12 by 16 in. — which fits into the new chase.



New Laszlo Universal Press

The press has two interchangeable printing beds: the chase for type, blocks, and stones; and the flatbed for metal and plastic etching and litho plates.

For color printing in perfect register, there is a simple provision in the design of the press to keep the paper and the plates in registered position.

The manufacturers further organized their supply department, which sells all tools, materials, papers, plates, stones, brayers, chemicals, etc.

Catalogs and further information are available on request.

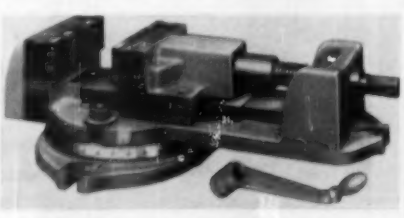
(For Convenience Circle Index Code 0107)

NEW HEAVY DUTY MACHINE VISES

The first two models of a new line of heavy duty vises for use on milling machines and other machine tools has just been made available by Wilton Tool Manufacturing Company.

The new vises are outstanding for their precision and sturdiness. The maximum opening of 6¼ in. on Wilton's new 6-in. jaw vise is

(Continued on next page)



New Heavy Duty Machine Vises

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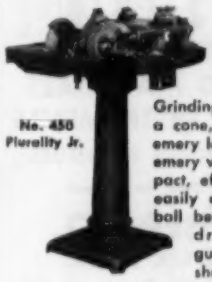

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DONJER PRODUCTS COMPANY

SHOP EQUIPMENT NEWS

(Continued from previous page)

about 50 per cent greater than shown by other vises of similar type.

The vises are available for immediate delivery in 6-in. jaw widths in two styles; with graduated swivel base, or stationary flanged base. They carry Wilton's 5-Year Unconditional Guarantee. Literature and full technical data are available.

(For Convenience Circle Index Code 0108)

NEW MITER GAUGE WITH MANY ADVANTAGES

Max Universal Miter Gauge is a protractor attachment for power tools, which is simple in functional design, and efficient in use.

Max Universal Miter Gauge

In place of the single working face found in conventional protractors this gauge has two working faces at right angles to each other. This arrangement permits angle cutting or grinding with a full range of single and complementary angles without change of settings.

The body of this gauge is made of a tough aluminum alloy and will stand up under severe use. It is securely mounted on a ⅜ by ¼-in. steel bar which fits most makes of power tools, including the firm's popular MAX 16, 20, and 30-in. disk sanders and grinders. No extra charge for gauge with plain bar in any other size.

Produced by the Max Mfg. Co.

(For Convenience Circle Index Code 0109)

A NEW STOCK HANDLING CART

Precision Equipment Co. announces production of an extra-heavy duty stock handling

(Continued on page 27A)

New Stock Handling Cart

GLUING WITH HOT GLUE

is practical and economical for school shop and home use. Teach the boys what good glue can do by heating it in Sta-Warm electric glue pots. Cap. 1 to 12 qts. 110 V. A.C. Safe non-burning electric heat. Removable insert with bail brush-wiper, and lid if desired. Specify Sta-Warm glue melters.

Cut-away view showing how heating element completely covers sides and bottom of pot to maintain even heat distribution at low wattage.

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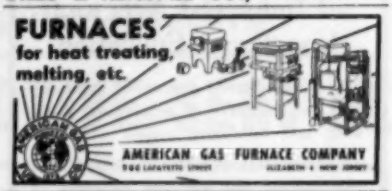

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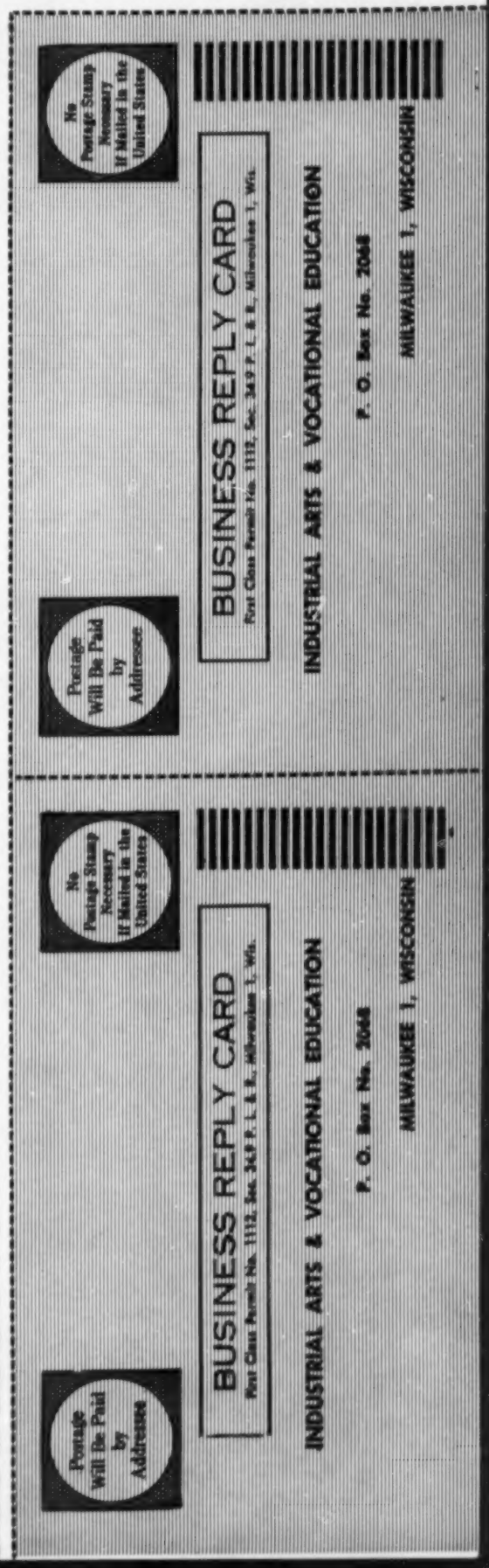
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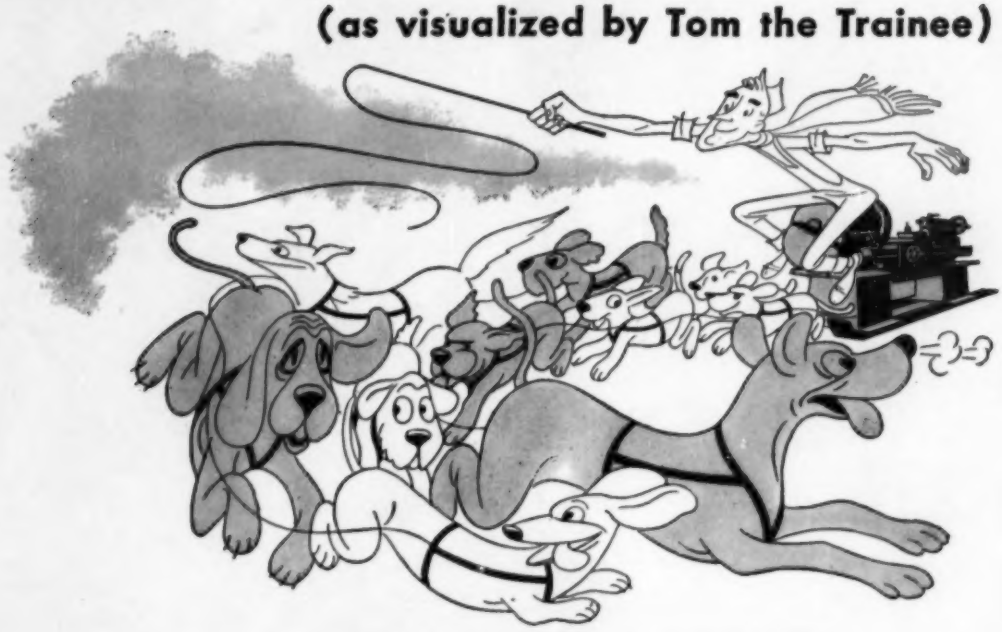

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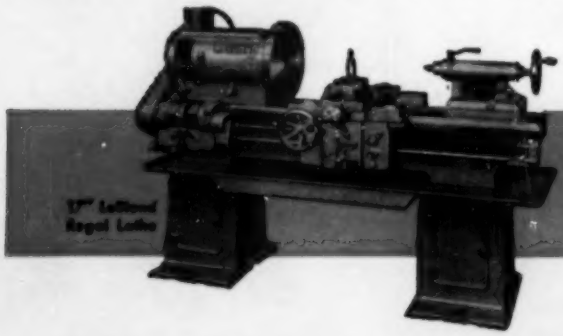

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